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# PREFACE.

WHEN the title-page of a new book in any degree interests the reader, his first desire is to learn, in brief, the nature and aim of the work. To indicate, therefore, the subject, plan and character of the present volume, the writer makes the following prefatory statements:

The visible universe is a manifestation of its invisible Creator, an objective revelation of his eternal wisdom and power and goodness. The vast globes and controlling forces of the universe are a manifestation of his creative might; the perfection of the arrangements which secure its safety and welfare is a manifestation of his all-comprehending knowledge; and the number, variety and beauty of its productions are a manifestation of his boundless beneficence. All the designs and adaptations it exhibits are God's designs and adaptations. Its elements and the laws which govern them had their origin in the conceptions and purposes of God. All the ideas disclosed in it are God's ideas. In the forms, properties and relations of the various bodies and substances which compose it, we discern the thoughts that "in the beginning" occupied the Divine Mind. Whatever exists in any particular shape, color, or condition in the vast creation, so exists because God willed its existence to be such. And thus whatever he has made is an expression of his nature or character. Every organized being, every unorganized substance, every force, every affinity, in nature, reads to man a lesson of highest import concerning his Maker and Preserver. Every flowing stream, every moving breeze, every descending ray of light, brings him a message full of divinity.

Creation is a book, written within and without by the finger of God, and, to him who can read it, is full of sublime and priceless



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instruction. Its pages are crowded with significant imagery, with expressive types and symbols of eternal truths and realities, portrayed and imprinted there by the great Father of all for the education of his earthly offspring as heirs of immortality. Every material object is suggestive to them of some moral truth, and every natural process is symbolical of some spiritual change or progress. And it is altogether a most interesting and profitable study to trace out this resemblance or analogy between things natural and things spiritual. He who with a devout mind searches diligently into the arrangements and relations, structures and functions, properties and beauties, of material nature, will constantly meet with exhibitions which shall seem to him as the pages of Scripture, written on the fields and the forests, in the stars and on the clouds, in the solid rocks and on the waves of the sea.

There is such a correspondence, such a similarity, characterizing the material and the spiritual, that no small portion even of the "gospel of grace" may be read from the fair face of nature. How many of the divine discourses of the Great Teacher are composed, wholly or in part, of simple *translations* of the inarticulate language of nature—of the lilies of the field and fowls of the air, of the sun arising and the rain descending on the evil and the good, of the salt without savor, the leaven in the meal, the pearl of great price, the seed among thorns and on the rock and in the good soil, the vine and its branches, the lost and wandering sheep, the hen gathering her brood under her wings, the seed dying in the ground to multiply its kind, the fruitless fig tree, the wind blowing where it listeth, the fields whitening for the harvest, the sky red and lowering, etc. The lessons which the Saviour read from these objects were not new ideas, not new truths fresh from heaven, but old, and which nature had presented before man for his instruction ever since the world began. He simply taught men how to *read* and *understand* them. His beautiful parables and many of his exquisite illustrations are but literal interpretations of the silent language of these and other objects in nature. Hence we learn from highest authority, that the same principles of law and order rule in the world of matter as are ordained to govern in the world of mind, and that what may be traced of the attributes and character of the great God, in the book of nature, is in perfect accord with what is taught in the book of inspiration.

If we would *select* a special object or province for this kind of study—for the field is boundless—we could not find one richer in

illustrations of the divine perfections, of the doctrines of redeeming grace, and of the interests and duties and hopes of man, than that which has been chosen for the subject of this volume—THE SUN. This great and central luminary, by his potent and all-embracing influences, is intimately connected with all the marvellous facts embraced within the whole circle of the Natural Sciences. To the mind acquainted with what *geometry* has demonstrated respecting its distance, magnitude and attraction; with what the *telescope* has revealed as existing and transpiring upon its surface; with what the *spectroscope* has read of the mystic inscriptions upon its descending beams; with what *chemistry* has brought to light of the wonder-workings of its invisible rays; with what *observation* has detected of its waves of magnetic influence thrilling the solid globes of all its planets; and with what *experiment and computation* have proved of the stupendous work its heat daily accomplishes—to such a mind, the Sun presents a concourse of phenomena of the most interesting, most sublime and inspiring character. To the man at all familiar with these facts, if imbued with the spirit of piety, the Solar Orb is as a glorious SHECHINA, poised aloft in the great temple of creation, forever witnessing to the eternal wisdom, power and glory of its Maker and Builder, who is God.

In Holy Writ, the Sun stands as a symbol of the MESSIAH. There he is entitled "The LIGHT of the World," and "The SUN OF RIGHTEOUSNESS." And of all objects within the reach of human vision, the Sun is the most worthy type of him who is "the Brightness of the Father's glory;" and its forces and functions, in the system of nature, offer the most striking and instructive *analogies* of his divine character, gracious offices, and moral relations, as the Saviour of the world. And it is to the contemplation of these analogies that the following pages are devoted.

The Analogies of the great Orb of Day to the Sun of Righteousness are many and various; and, for the sake of order and clearness, those here traced have been classified according to their nature and import, and are presented under the following distinct heads: First, those of the Sun as the *Primary Globe;* second, as the *Fountain of Light;* third, as the *Source of Heat;* fourth, as a *Chemical Agent;* fifth, as a *Magnetic Centre;* and, sixth, as the *Centre of Gravitation.*

The plan adopted and pursued throughout the work is simply this: Each particular Analogy is briefly and clearly enunciated, and forms the subject of a distinct chapter, in which, first, are

related and described the *natural phenomena* pertaining to the Sun which supply it, as revealed by the latest and most accurate deductions of science; then the *spiritual parallel* to all these in the character, or offices, or relations of the Sun of Righteousness, is traced out, and its specific instructions presented. These will be found, throughout, both evangelical in their sentiments and catholic in their spirit. The writer nowhere descends to discuss, much less to advocate, any denominational distinctions or peculiarities. In this regard, his aim has been to be as general and impartial in the statement of grand truths, as the Sun, of which he speaks, is in shedding down his light and heat upon the face of the earth.

Contemplated under the several aspects exhibited in these Analogies, the Solar Orb will be found to typify and beautifully illustrate most, if not all, of the gracious doctrines of the gospel which relate to the Sun of Righteousness. Its every force, every function, every law, every phenomenon, will be discovered to enshrine spiritual lessons of profoundest interest and importance; while all these taken together constitute it a sublime *Symbol* of him who, as a Divine Luminary, arose with light and healing in his beams on a benighted and dying world.

Such is the subject, and such is the character of this volume. And if its readers, be they few or many, shall derive from its perusal a tithe of the pleasure and profit which the author has experienced in the study of the subjects it presents, his fondest hopes concerning it will be realized, and his long labor in its preparation will not fail of its highest reward.

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### THE SUN AS THE PRIMARY GLOBE.

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# PART SECOND.

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*As the Sun is a self-luminous globe, and sends forth from its own body and sphere a flood of light on every side—so Christ the Sun of Righteousness was a self-luminous orb, and poured the light of truth and wisdom upon all around him, from the fountain of his own mind.*

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## ANALOGY X.

*As the Sun of nature effects the illumination of the earth through the reflective agency of the atmosphere upon which its rays fall—so the Sun of Righteousness is to accomplish the illumination of the world of mankind through the reflective agency of those upon whom his light shines.*

PHENOMENA. The atmospheric ocean—By its reflection and refraction sunlight is converted into daylight—What the aspect of the world would be without this agency—The inconveniences and evils that would prevail—Effects produced by greatly rarefied atmosphere—Appearance of the heavens and surrounding objects on the summit of Mount Blanc—The moon a world without atmosphere—The strange and startling aspect of her scenery—What we owe to the reflective and dispersive power of the atmosphere—Design and adaptation plainly visible in this—God manifest here as in all his works.....*Page* 258

TEACHINGS. The great lesson from all this—The light shed by the Sun of Righteousness to be reflected and dispersed through all the world—Believers to be reflectors—"Let your light shine before men"—Human minds like sensitized plates—Every man reflects the light or spirit that is in him—No one can divest himself of this influence—Importance of reflecting the true light—The young mind specially susceptible to impressions—Parents photograph their likeness on the minds of their children—The Christian in every relation to reflect the light of the gospel—By labor and sacrifice as well as example—From this none are released or exempt—He who fails denies the light—Believers the appointed *medium* to invest the world with daylight.....*Page* 266

## ANALOGY XI.

*As the Sun of nature, viewed through the dank vapors afloat in the atmosphere, appears discolored, and sometimes distorted—so the Sun of Righteousness, looked upon through the dark mists of the carnal mind, appears in a character that belongs not to him, and often as without form or comeliness that he should be desired.*

PHENOMENA. The atmosphere, its components—Effects of being rarefied or condensed—Viewed through vapors, the Sun appears in false colors—Sometimes, in a false form—Occasionally, surrounded by appendages which do not belong to it—Halos and parhelia—These often observed—Notable ones described—Of irregular recurrence and evanescent nature, yet formed according to exact laws.....*Page* 273

TEACHINGS. The parallel—Mental vapors—Viewed through these, the Sun of Righteousness is discolored and distorted—To some, appears as an impostor—To others, a myth—To others still, an enthusiast—Carnal views and frozen devotions surround him with associates—The Virgin and the Saints—Mental Anthelia—These as dependent on the Sun of Righteousness as parhelia on the Sun of nature.....*Page* 283

## ANALOGY XII.

*As the Sun stands alone as a luminary, unrivalled in splendor by any orb of heaven—so Christ the Sun of Righteousness stands alone as a Teacher, unequalled and unapproached in the wisdom, purity and benevolence of his instructions.*

PHENOMENA. Efforts made to measure the Sun's light—Its illuminating power and intrinsic brilliancy—Comparisons made by Bouguer and Wollaston—Other and superior comparisons—The brightest artificial light as a dark spot on the bosom of the Sun—Percentage of the Sun's light absorbed by the atmosphere—The Sun compared with the fixed stars, the planets, and the moon—Infinitely transcends all.....*Page* 291

TEACHINGS. So the Sun of Righteousness is infinitely superior to all other teachers—Ancient sages—Teachings and errors of Menu—Of Confucius—Of Zoroaster—Of Pythagoras—Of Socrates—Of Plato—Of Aristotle—Of Epicurus—Of Zeno and the Stoics—Increased light has exposed gross errors in all these—Light of the present day demands not the change of a term in the teachings of Christ—His gospel contains riches of wisdom and truth found nowhere else—Solves the mystery of life—Meets the deepest cravings of the soul—Like the Sun, He stands without a compeer.....*Page* 295

## ANALOGY XIII.

*As the Sun's light is reflected from the ten thousand objects upon which it falls in so many systems of ether waves, which, though simultaneous in their outward flow, yet neither obliterate nor confuse one another—so the gracious light of the Sun of Righteousness, falling upon ten thousand souls, is reflected in so many prayers, which, though simultaneous in their ascent, yet neither drown nor confound one another.*

PHENOMENA. Ether waves—Water waves described—Two or more water waves co-existent—Air waves created by a whole orchestra remain distinct—So ether waves from a thousand centres neither obliterate nor confound one another—Here are marvels of creation—To whom to be ascribed.....*Page* 317

TEACHINGS. The parallel lesson—Luminiferous ether a type of the Omnipresent Spirit—All are afloat in his boundless sensorium—Observant of every tear—Sensitive to every sigh of devotion—The Te Deum of the multitude drown not the cry of the solitary penitent—The prayers of the monarch precede not the petitions of the slave—No respect of persons—Rich unto all that call upon him..... *Page* 322

## ANALOGY XIV.

*As the Sun of nature darts down his beams, messengers of light, with amazing speed, to illumine and cherish the living tenants of the earth—so the Sun of Righteousness sends forth his angels, with like speed, to minister to them who shall be heirs of salvation.*

PHENOMENA. The speed of sound long known—Speed of light a modern discovery—Discovered by means of Jupiter and its satellites—These a beautiful system—Have led to the solution of many problems—The calculated and actual times of the satellites' eclipses compared—By this Rœmer determined the velocity of light—His calculation corroborated—Illustrations of this velocity—The Sun in constant communication with the whole system.....*Page* 326

TEACHINGS. So the Sun of Righteousness with his whole church—His messengers, angels—Angelic visits in Bible times—Still minister to his people—This in harmony with the economy of grace—"Wings" emblems of speed—Gabriel commanded to visit Daniel—Rapidity of his flight—Paul comforted by an angel in the storm—The globe's progressive and rotary motions no difficulties—Angels may be messengers also to other planets—Physical forces have no power over them—Saints to be as or equal to the angels—Like them, may visit other worlds.....*Page* 330

## ANALOGY XV.

*As the light of the Sun, while it reveals all else, remains itself invisible—so the Holy Spirit of the Sun of Righteousness, while he reveals all things pertaining to life and godliness, himself cannot be seen or apprehended by any of our senses.*

PHENOMENA. That light is visible, an erroneous impression—Sunbeam in a dark room—Lamp in a foggy night—Light-waves become visible only by reflection—Illustration from a windmill—Proof from the progressive motion of the moon—From the planets—Placed in interstellar space, we should be in utter darkness—Light reveals all things, but is itself invisible.....*Page* 338

TEACHINGS. A help to apprehend the agency of the Holy Spirit—Bodily sense incapable of discerning spiritual existence—The Spirit invisible, but reveals all—Imparts correct views of the truth—Of the law of God—Of man's character—Of the Saviour and his offices—Exhibits all things in a new light—Himself cannot be seen, or heard, or felt—Remains a glorious mystery.....*Page* 342

## ANALOGY XVI.

*As the light of the Sun of nature, falling upon defective organs of vision, is obstructed and fails to confer its full advantages—so the light of the Sun of Righteousness, falling upon perverse minds, is opposed and fails to impart the fulness of its blessings.*

PHENOMENA AND TEACHINGS. The eye subject to many diseases and injuries

—So is the mental eye—Comparison of the Great Teacher—The sound eye—The near-sighted eye—The cobwebbed eye—The color-blind eye—The jaundiced eye—The cataract eye—Ephphatha.....*Page* 347

## ANALOGY XVII.

*As the Sun of nature, in passing through the obscuration of an eclipse, discloses physical wonders, which else would have remained invisible—so the Sun of Righteousness, in passing through the darkness of the tomb, reveals Divine glories, which otherwise would have remained unknown.*

PHENOMENA. Eclipses of frequent occurrence—Partial, annular and total eclipses defined—Total eclipses awe-inspiring sights—Baily's beads—The corona described—The prominences, sierras and flames observed on the sun—Those of 1842 described—Those of 1851, as observed by Prof. Airy—The phenomena of the eclipse of 1860—Those of 1868 and 1869, and their extraordinary aspects—Stupendous height of flames—Rapid and surprising changes—The most marvellous ever witnessed described by Prof. Young—General conclusions of Secchi and Lockyer—All unknown but for eclipses.....*Page* 360

TEACHINGS. Symbols of a grander event—The mysterious eclipse of the tomb——Came to pass according to a determinate plan—The dread and ominous darkness—The revelations made in the Sun of Righteousness—The glories of his love break forth—The grandeur of his atonement displayed—The seal of the resurrection and the title-deed to eternal life exhibited to angels and men—The tomb of nature illuminated by the tomb of Christ.....*Page* 378

## ANALOGY XVIII.

*As the Sun of nature, after having been eclipsed, continues to shed its light as before upon the dark and desolate orb of the moon that had invaded its glories—so the Sun of Righteousness, after his eclipse in the darkness of the tomb, ceased not to pour his gracious light on the ungrateful race that had crucified and slain him.*

PHENOMENA. Superstitious ideas of eclipses—Regarded as miraculous occurrences—A battle of the Medes and Persians arrested by an eclipse—Xerxes and Pericles alarmed by an eclipse—Hindoo notions of an eclipse—Scene at Tripoli during a total eclipse—A correct understanding saves from groundless fears—The intrinsic brilliancy of the Sun not affected by an eclipse—The darkness at the crucifixion not a natural eclipse—Eclipse of the moon on that evening—A prophecy thereby fulfilled.....*Page* 383

TEACHINGS. The parallel—Eclipse of the tomb wrought no change in Christ—The love and purpose of his heart still the same—Still loved and pitied his enemies—"Beginning at Jerusalem"—Loved and pitied our ungrateful race—"Go preach the gospel to every creature"—His love unquenchable.....*Page* 390

# PART THIRD.

## THE SUN AS THE SOURCE OF HEAT.

### ANALOGY I.

*As the Solar Orb is the fountain from whence the whole system of nature derives its vivifying heat—so Christ the Sun of Righteousness is the source from whence the whole system of revealed religion derives its spiritual vitality.*

PHENOMENA. As the light, so the heat of the Sun, full of instruction—The earth's heat all derived from the Sun—Our world once a molten globe—Illuminating and heating rays combined in the sunbeam—The power of invisible rays brought to a focus—Burning glasses fusing metals—Archimedes at the siege of Syracuse—Herschel's calculation of the total solar heat falling on the earth—Pouillet's estimate of the same—Tyndall's illustration of the amount of heat required to evaporate water—This applied to rivers, glaciers and polar snows—The Sun the life of our world..... *Page* 394

TEACHINGS. What the Sun is to nature, Christ is to the Bible, to religion—Christ the life of its doctrines—Of its ordinances—Of its graces—Of its duties—Of its happiness—Religion without Christ can have no existence..... *Page* 401

### ANALOGY II.

*As the origination and permanence of the Sun's heat, for the benefit of the planetary system, are inexplicable to human science—so the incentive and perpetuity of the love of Christ, the Sun of Righteousness, for the race of man, are past all human understanding.*

PHENOMENA. The total amount of heat thrown out by the solar globe—Its intrinsic heat—Computation of this made by Pouillet, Herschel, and Tyndall—How originated this great heat?—Plausible hypothesis—How has the solar heat been sustained and perpetuated?—Several answers proposed—The cooling theory—The combustion theory—The contraction theory—The friction theory—The meteoric theory—Calculations respecting the fall and concussion of the planets—The theory of electric excitation—The subject baffling to all science—Solar conditions widely different from terrestrial—The problem unsolved..... *Page* 404

TEACHINGS. Type of a greater mystery in the Sun of Righteousness—The love of Christ without beginning or end—His foresight of the world's history—His anticipation of man's redemption—Forsakes heaven and the bosom of the Father—Assumes the nature of man—Chooses a condition of poverty—Endures the ingratitude, injustice, and cruelty of sinners—Dies upon the cross—Mystery of mysteries—What awakened and sustained this amazing love?—The eternal and boundless benignity of his nature—God is love..... *Page* 419

### ANALOGY III.

*As the Sun's warm beams are the origin of all material energy and motion on the face of the earth—so the Sun of Righteousness is the origin of all spiritual life and activity in the world of mankind.*

PHENOMENA—The centennial exhibition—Machinery Hall—The Corliss engine the one moving power of all—So the Sun of all terrestrial machinery—The Sun

the power that produces every breeze, and wind, and tempest in the atmosphere—That creates every current and commotion in the ocean—That perpetuates the flow of every river, and spring, and fountain—That clothes every plain with verdure and every field with corn—That imparts strength and activity to every beast and bird—That drives every mill, and furnace, and factory—That feeds, and clothes, and comforts man—And this, not as the efficient but instrumental cause—The solar and every other energy ultimately derived from the will-power of the Almighty.....*Page* 426

TEACHINGS. So the Sun of Righteousness is the origin of all motion and energy in the world of mind—Apart from Christ all are dead—He is the life and power of the renewed soul—The life and power of the church—The effective energy for all moral good—From him flows the river of life.....*Page* 434

## ANALOGY IV.

*As the Sun's warm rays, though adapted and designed to minister to the welfare of the whole living world, yet sometimes creates storms and whirlwinds that spread destruction far and wide;—so the divine teachings of the Sun of Righteousness, though designed and fitted to promote and secure the best interests of the whole human race, yet sometimes excite hatred and persecution that spread and devastate whole kingdoms.*

PHENOMENA. The Sun, though a universal benefactor, yet creates storms—Velocity and force of winds—The great storm of 1703, in England—Whirlwinds, how produced—Tornadoes in the United States—Hurricanes in the West Indies—Hurricanes in India—Simoons in Northern Africa—Fate of the army of Cambyses—Of Alexander—Simoon in Southern Palestine described—Such storms not altogether evil in their effects—The deliverance wrought for Grenada by a tornado—The pestilence swept from England by a tempest—Sanitary effects of hurricanes in South America—Partial evil, general good.....*Page* 437

TEACHINGS. Similar results in the moral world—Christ the friend of universal humanity—His doctrines and precepts all true and good—Designed to restore the reign of Love—Enmity of the carnal mind—Persecution of himself and apostles by the Jews—Heathen incentives to persecution—Nero's persecution—His successors follow his example—Millions perish—Persecutions of the Church of Rome—Massacres in France—Martyrdoms in England—Bloodshed in Ireland—Christianity the occasion, not the cause—Good brought out of evil—Shining examples of faith, fortitude, and devotion.....*Page* 450

## ANALOGY V.

*As the Sun of nature, by the simple power of his warm beams, overcomes all the rigor and resistance of winter, to clothe the earth with the verdure and fruits of summer;—so the Sun of Righteousness, by the gentle power of his love, is to overcome all the hatred and opposition of enemies, and overspread the world with the saving truth and peaceable fruits of his Gospel.*

PHENOMENA. Voyagers in a balloon or in a ship's cabin unconscious of motion—So we are unconscious of the earth's motion—The earth further from the Sun in summer than in winter—Revolution of the seasons explained—Dreariness of winter—Return of summer as an enchanting miracle. .....*Page* 464

TEACHINGS. A greater miracle to be wrought in the moral world—The change incredible to an inhabitant of a sinless world—A new element of power introduced by the cross—What this has done, a pledge of what it will accomplish—Its power irresistible—Sure promises of its final triumph.....*Page* 468

## ANALOGY VI.

*As the Sun of nature, by its warm beams, draws upward the vapors from the sea and land, to be condensed and presently returned in refreshing showers on the heated plains and thirsty fields;—so the Sun of Righteousness, warming the hearts of his people, draws forth their prayers and supplications, to return, in due time, in gracious effusions upon their own souls and upon those of others.*

PHENOMENA. Rain the product of marvellous contrivances—Evaporation: conditions necessary for it—Requires the expenditure of stupendous power—Condensation, how effected—Vapors broken up into distinct clouds—Beauty and benefit of this arrangement—Transportation of the clouds—How made to release their watery contents—These discharged in gentle showers—The advantages of this method.....*Page* 473

TEACHINGS. Beautiful imagery of Divine Grace—Prayers drawn forth under the influence of the Sun of Righteousness—All true prayer assured of an answer—Grace bestowed in proportion to the prayer offered—Instances in Bible characters and modern reformers—Revivals preceded by much prayer—Examples from Scripture history and modern times—Without prayer, the church as the earth without rain.....*Page* 479

## ANALOGY VII.

*As the warm rays of the Sun, while they are stimulating and strengthening the plants and flowers of the field through the hours of the day, are at the same time preparing the dews that are to refresh them through the watches of the night;—so the Holy Spirit of the Sun of Righteousness, while he is quickening and instructing his people in their brighter days, is at the same time fostering the graces that are to cheer and sustain them, in the darker seasons of age and adversity.*

PHENOMENA. Dew-drops, when formed—Notions of the Alchymists—How dew is formed—Radiation of heat—This dependent on both color and contexture—Each species of plant has its own peculiar power of radiation—Green the prevailing color, its advantages—When dew is most and least copious—Dew on Hermon—Wisdom and beneficence of the Divine arrangements.....*Page* 486

TEACHINGS. Dews of grace—Admirable provisions—Piety a growth in the heart—How nourished and promoted—Faith, love, and hope daily strengthened—These sustain and comfort when night comes on, and the world fades from view.....*Page* 492

## ANALOGY VIII.

*As the trees, plants, and flowers that have their home more directly under the Sun's rays exceed in luxuriance, fruitfulness, and beauty those that have their habitation in regions more remote,—so the Souls that live more immediately beneath the Sun of Righteousness excel in spiritual vigor, fruits of grace, and beauty of holiness those who are content to live at a greater distance.*

PHENOMENA. Influence of climate on vegetation—Vegetation of the Arctic Regions—Of Northern Europe—Of Sweden and Denmark—Of France, Germany, and parallel countries—Of Southern Europe—Of the Tropical countries—The richness and magnificence of Brazilian scenes—Luxuriance and fruitfulness of the Torrid Zone—Brilliancy of foliage, flowers, and plumage—Long scale and great contrast.....*Page* 495

TEACHINGS. The parallel—Religion has its polar, intermediate, and equatorial climes—Gradation in plants of piety—Arctic piety, how accounted for—Temperate Zone piety, described—Tropical piety— Examples and illustrations of the last—Attainable only beneath the warm and luminous beams of the Sun of Righteousness.....*Page* 501

## ANALOGY IX.

*As the Sun's warm rays may be conveyed and converged through a lens with melting or consuming power to objects beyond, while the temperature of that lens itself remains unchanged ;—so the quickening truth of the Sun of Righteousness may be communicated by a speaker or a writer with softening and saving power to others, while he himself remains unchanged and uninfluenced by that truth.*

PHENOMENA. Transparency to light and heat—Substances transparent to one, not to the other—Pure dry air not warmed by the Sun—Tyndall's experience on Mount Blanc—Clear glass not heated in the sunshine—Proof from powerful lenses —Effects produced by a lens of ice—Existing transparency and opacity of different substances evidences of wisdom and benevolence.....*Page* 513

TEACHINGS. The lesson—Transparency and opacity to Divine truth—Bad men often employed to accomplish great good—" Have we not cast out devils? "—Nature of truth not changed in passing through unclean lips—A sinner may edify saints—Illustrative anecdote—The born blind may explain the laws of light—A correct map of untravelled roads—Self-deception easy and common—Success in the ministry no certain evidence of a state of grace.....*Page* 518

## ANALOGY X.

*As the Sun of Nature, in drawing upward the vapors that are to form the fleecy clouds on high, separates and leaves behind every particle of the gross materials with which, as water, they had been connected,—so the Sun of Righteousness, when he lifts the souls of his redeemed to the skies, divests them of all the corruption with which they had been affected in the body, so that they ascend pure and stainless to dwell in his presence.*

PHENOMENA. No pure water on the face of the earth—Its impurities sometimes visible, sometimes invisible—Sparkling water often impregnated with minerals—Waters of Marah—The purest streams yet found—Water supplies of great cities—Water of inland seas—Analysis of ocean water—The vapors free from all impurities—Great importance of this—Salty rain—Ciniretious rain—Red, yellow, and black rains—Extraordinary atmospheric disturbance—Existing meteorological arrangements worthy of devout admiration.....*Page* 523

TEACHINGS. " Waters " a figurative term for multitudes, peoples—Those drawn upward by the Sun of Righteousness leave behind all impurities—He came to deliver from sin—At death, the last stain wiped away—Death a great gain to the Christian.....*Page* 531

# PART FOURTH.

## THE SUN AS THE SOURCE OF ACTINISM.

### ANALOGY I.

*As the beams of the Sun of Nature descend with threefold power, and not only illuminate and heat, but also work a change in the constitution of the substances upon which they fall;—so the beams of the Sun of Righteousness not only enlighten and warm, but regenerate the souls into which they enter.*

PHENOMENA. Three rays combined in the sunbeam—Light, heat, and actinism—The prismatic range of each—Actinic rays proved by their effects—Produce change of colors and combinations—Effects on gases and solutions—Foliage, flowers, and maps copied by means of—Photography, and its various applications—Microscopic photography—Volumes and libraries reduced to a small compass—How employed during the siege of Paris—Rapidity of the Sun's chemistry—Birds taken on the wing—Sunbeam affects all things.....*Page* 534

TEACHINGS. So the beams of the Sun of Righteousness—Transforming power of his truth may be intercepted—Fitted to change all—Seen only in its fruits—Produces pearls of grace—Dissolves affinity for sin, and creates for holiness—Renews and sanctifies—Profitable for all states and occupations—Materialism silenced, and faith strengthened.....*Page* 544

### ANALOGY II.

*As the chemical action of the Sun varies with the progress of the seasons, to meet the varying requirements of vegetation, from its germination to its maturity;—so the gracious influences of the Sun of Righteousness vary according to the wants and circumstances of his followers, from the day of their spiritual birth to that of their full fruition in the kingdom of glory.*

PHENOMENA. Uniformity of natural forces—Yet one force modifies the action of another—Solar forces modified by the atmosphere—Actinic force varies with the Sun's altitude—Media for intercepting light, or heat, or actinism—Respective influence of these on vegetation—Interesting experiments—Actinic rays specially concerned in the germination of plants—Luminous rays in their growth and coloring—Heat rays in maturing and ripening their fruit—Marvellous adaptations herein displayed .....*Page* 548

TEACHINGS. The parallel in the kingdom of grace—Parable of the seed growing secretly—Correspondence of the three stages of nature to the three stages of grace—The Christian in the state represented by the "blade"—In that indicated by the "ear"—In that described as "the full corn in the ear"..... .....*Page* 556

# PART FIFTH.

## THE SUN AS A MAGNETIC CENTRE.

### ANALOGY.

*As the globe of the earth is ever in magnetic sympathy with that of the Sun;—so the church, or body of believers, is ever in loving sympathy with Christ the Sun of Righteousness.*

PHENOMENA. Discovery of the lodestone—Invention of the compass—The lodestone arranging iron filings—Suspended, ever turns in one direction—Magnetism excited, not imparted—Nature of magnetism not understood—A universal force—Concerned in the formation of crystals and metallic veins—Pervades vegetable and animal substances—The globe a great magnet—Influenced by the magnetism of the Sun—Evidence of this from various oscillations of the needle—From solar spots—Magnetic storms—Extraordinary auroras—All prove the earth in magnetic sympathy with the Sun—The whole universe the product of one mind ..... *Page* 563

TEACHINGS. The spiritual parallel—Each regenerate soul, and therefore the whole church, in sympathy with Christ—In his grief—In his tears—In his joy—In his desire to save the world—A stranger to this sympathy, a stranger to him ..... *Page* 574

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# PART SIXTH.

## THE SUN AS THE CENTRE OF GRAVITATION.

### ANALOGY I.

*As the Sun's gravitation is the ruling force that continues the revolutions and ensures the safety of the planetary system;—so the love of the Sun of Righteousness is the efficient power that perpetuates the activity and guarantees the safety of the church.*

PHENOMENA. Solitude of the solar system—The bodies that compose it—The power that rules it—Gravitation in proportion to mass—Mass of the Sun and planets—Planets guided by two forces—These illustrated—Bodies attract each other inversely as the square of their distances—Many other laws possible—This only could ensure safety and harmony—The evils that would result from a change of this law—Existing law superior to any other conceivable—Hence a clear evidence of Intelligence in its choice ..... *Page* 577

TEACHINGS. The same principle discernible in the spiritual as in the natural system—Like gravitation, the love of Christ the ruling power—To this, not its own, the soul owes its safety—This withdrawn, it would become a wandering star—The cross is the centre of gravitation—Its attractive influence described—A power adequate to overcome all others—Who shall separate us from the love of Christ? ..... *Page* 584

## ANALOGY II.

*As the Sun's gravitation is instantaneous and unremitting in its action upon all the globes of the system;—so the love of the Sun of Righteousness is instantaneous and unremitting in its exercise towards every member of his church.*

PHENOMENA. What is gravitation?—Various theories—Gravitation knows no obstacles—Instantaneous in its action—Implies both creation and annihilation—Examples and illustrations of this—Theory of Le Sage and Thomson—Its futility—None other than the will power of the Almighty.....*Page* 589

TEACHINGS. Instructive mystery—Love of Christ, like gravitation, instantaneous—Ever present—Exercised impartially—Cannot be intercepted or impeded—Not divided by numbers—Not enfeebled by time—Mystery no greater objection to religion than to science—Must become as little children.....*Page* 595

## ANALOGY III.

*As, in obedience to the law of gravitation, the nearer a planet's orbit is to the Sun the swifter its motion around him;—so, in virtue of the law of love, the nearer the Christian's path to the Sun of Righteousness, the greater the speed and delight with which he runs in it.*

PHENOMENA. Early views of the celestial motions—Those of Pythagoras and Aristarchus—Theory of Ptolemy—Copernicus, Kepler and Galileo establish the true theory—The theory of Vortices—Newton's demonstration of the planetary motions—These illustrated by means of a cannon ball—Exact balance of centrifugal and centripetal forces—The original impulse must be right both in degree and direction—Velocity per second of the planets—Law of velocities—The nearer the Sun, the greater the speed.....*Page* 600

TEACHINGS. The mechanism of the system proclaims its Author—Its distances and velocities typical of those in the spiritual system—Some Christians like the remoter planets—Some like the middle planets—And some like the inner planets—While those departed are as translated to new and still nearer orbits—The nearer to Christ the greater our safety as well as activity—The peril of yielding to opposing attraction—The path of the erratic planet a solemn warning.....*Page* 609

## ANALOGY IV.

*As the Sun of nature guides and controls his planetary family, not by pressure or contact, but by the subtle influence of his gravity;—so the Sun of Righteousness leads and governs his human family, not by force or constraint, but by the attracting influence of his truth and love.*

PHENOMENA. Man the inventor of many things—But borrows his materials—Takes advantage of forces already in operation—God the author of these as well as of their combinations—He borrows nothing—The celestial machinery wholly different from man's contrivances—Here are no material bonds or connections—All are impelled and guided by invisible power.....*Page* 614

TEACHINGS. So in the spiritual system—Here the only power is that of truth and love—No constraint or force employed—Man free to choose or reject—Every man conscious of this—Necessary to religion and accountability—The gospel assumes it—Appeals to reason and conscience only—Man answerable for his belief—Free in accepting and embracing Christ—Office of the Holy Spirit—Man free from first to last.....*Page* 617

## ANALOGY V.

*As the force of gravitation, which rules in the system of nature, is so evenly and finely balanced, that any change in the mass or distance of one of the planets would be felt at the centre of the Sun;—so the love, which reigns in the spiritual system, is so delicate and infallible, that whatever affects the condition or interest of one member is felt at the heart of the Sun of Righteousness.*

PHENOMENA. Newton's agitation on the discovery of the law of gravitation—The momentous conclusions to which the discovery immediately led—Weight of the earth determined—Process of weighing the planets—Volume, mass and density of the planets—The attraction of the Sun and each planet mutual—Any increase or decrease in the mass or distance of a planet productive of a corresponding change in its attraction—Every change in the system therefore felt at the centre of the Sun ..... *Page* 623

TEACHINGS. The same true of the Sun of Righteousness—His heart alive to all that affects his people—His relation to and union with them—Makes their joys and sorrows his joys and sorrows—Will reward their benefactors and punish their enemies ..... *Page* 628

## ANALOGY VI.

*As a planet, though drawn by the attraction of other planets to this or that side of its true orbit, will yet be slowly but surely brought back to it by the more powerful gravitation of the Sun;—so the Christian, though drawn by the influence of other men to this or that side of the straight and narrow path, will surely in time be restored to it by the superior attraction of the Sun of Righteousness.*

PHENOMENA. The mutual perturbation of the planets—The most difficult of astronomical problems—Perturbations of orbits, and their periods—Variations of their inclinations, and their periods—Variations of eccentricities, and their periods—Apprehension awakened by the discovery of these—The alarm vain, as all had been foreseen and provided for—Proved to be self correcting—A mathematical demonstration of omniscient and designing Intelligence ..... *Page* 632

TEACHINGS. Every force, law and motion has its lesson—Those now presented luminous with the gospel—The system of grace, like that of nature, perfect and unfailing—Every position and relation of the Christian, like those of the planet, foreseen and provided for—The soul's safety dependent on the attraction of the Sun of Righteousness, not its own—May deviate, but will be restored—"Not one faileth"—Complete corrective provisions possible in the spiritual universe, as in the material—The cycles of these, like those, may be "ages of ages"—The end glorious ..... *Page* 639

## ANALOGY VII.

*As the Sun, by his all-pervading gravitation, brings forward all the globes of the system to every position and point in their circuits, at the exact and predicted moment;—so the Sun of Righteousness, by his all-embracing providence, brings forward every event relating to his church and the world at the precise time afore appointed.*

PHENOMENA. The action of gravitation perfect—Subject to no decay or variation—Proof of this from solar and lunar eclipses—From the orbital revolutions of the planets—From the transits of Mercury and Venus—From the return of comets—The comet of 1680—Halley's comet—Other comets of long periods—The intellectual achievements of man evidences of his immortality ..... *Page* 646

TEACHINGS. Providence a parallel to gravitation—Prediction fulfilled a conclusive evidence in science and scripture—Prediction of the deluge, and its fulfilment—Concerning the division of the earth among the sons of Noah—Concerning the bondage in Egypt—Concerning the sons of Jacob—Concerning the defection and consequent calamities of the Jewish nation—Concerning the destruction of Nineveh, Babylon, and Tyre—Concerning the four great empires—Concerning the advent and crucifixion of the Messiah—Providence, like gravitation, unremitting and infallible over all.....*Page* 653

## ANALOGY VIII.

*As the Sun's gravitation, light, heat, and actinism, having in their outward flow bathed our globe on every side with their vital influences, sweep onward still, in undiminished fulness, to do the same for other globes that roll beyond;—so the incarnation, ministry, and atonement of the Sun of Righteousness, while profering an ample and suitable provision for all the wants and woes of sinful humanity, may in all their plentitude of grace, pass on to benefit and to bless the populations of other worlds.*

PHENOMENA. The Sun the common and equal benefactor of a family of worlds --Performs the same offices for the other planets as for our own—Hence those planets, like our own, may be the abodes of intelligences—The analogies that support this supposition stated—Confirmations from Scripture—Jehovah's empire.....*Page* 668

TEACHINGS. The spiritual parallel—The "healing beams" reaching other worlds—Much known of the Sun of Righteousness before—A new attribute revealed in the work of redemption—The fall of man known to angels—The destruction of the race expected—Manifestation of pity and grace a transporting revelation —Interested observers of every step in the Saviour's life—Ministered to him from the cradle to the grave—Their triumph when all was finished—Tidings carried to all intelligences—Reports of angels and disembodied souls—The earth the Calvary of the universe—Glimpses of the glorious and final results.....*Page* 674

## ANALOGY IX.

*As the Sun himself, in obedience to the universal law of gravity, is in motion, and carries with him the whole planetary system along an orbit so vast as to require for its completion a period beyond all human comprehension;—so the Sun of Righteousness, in virtue of his everlasting love, will lead onward his ransomed hosts along a cycle of ages beyond the enumeration of men or of angels.*

PHENOMENA. Discovery of spots on the Sun—Of its axial rotation—Its motion through space thence inferred—This proved by Herschel and others—The star regions through which it is travelling—The centre about which it revolves--Its rate of motion and period—The germ of this grand truth found in the Scripture.....*Page* 680

TEACHINGS. The general assembly of the saints--Seen of John—The spiritual food and drink promised and provided—Superior knowledge in the future state--New faculties for acquiring knowledge—The Redeemer himself their Teacher—Creation their field of study—Accompanied by angels in visits to other worlds—Variety and multiplicity of wonders in each globe--Systems and galaxies innumerable before them—Immensity of the universe—What progress in knowledge and wisdom made in the course of countless ages—Apostrophe to the doubter—Greater things already done—The soul a magnificent being—Parting word to the reader.....*Page* 685

# THE CELESTIAL SYMBOL.

IMMEDIATELY upon the fall of our unhappy progenitors, Adam and Eve, and ere yet the gates of the forfeited paradise had closed behind them, the MOST HIGH graciously made known to them that the purpose of his heart concerning them was still a purpose of mercy; a Vanquisher of the *serpent* was promised; in the fullness of time, "the Seed of the woman should bruise the serpent's head," and paradise be regained.

The character of this coming Deliverer, and the nature of the victory he was to achieve, however, were not fully announced at once, but gradually as men were able to receive the revelation; at first in general promises or prefigurations, then by types and ceremonies of various kinds, and finally through clearer symbols and more explicit predictions.

The objects chosen as types and symbols of the promised Saviour were many and various; some being designed to point out particular features in his character as a Divine Messenger, others to refer to his works of mercy and love, and others still to his sufferings as an atoning sacrifice. Hence some were of a more limited and

some of a more extended significance than others. They were, moreover, taken from every province of nature, animate and inanimate; the bleeding *Lamb*, the falling *Manna*, the gushing *Rock*, the *Brazen Serpent*, the *Rose of Sharon*, the *Lion of Judah*, the odoriferous *Incense*, the fruitful *Vine*, the morning *Star*, etc. But of all the Types and Symbols employed in the sacred volume to represent the advent of the Blessed Messiah the most instructive and sublime is *The Rising of the Sun upon a world wrapped in darkness.* No symbol could be more significant or appropriate than this to prefigure the appearing of him who should come to rescue the benighted and lost, to restore sight to the blind and liberty to the captive, to give to the sorrowing beauty for ashes, the oil of joy for mourning, and the garments of praise for the spirit of heaviness; for the Rising Sun is the source of light and life, the hope of the lost in darkness, the guide of the erring, the comfort and the joy of all. Hence the frequent use of this image by the sacred writers.

"Unto you that fear my name," says the prophet Malachi, "shall the SUN OF RIGHTEOUSNESS arise with healing in his wings."

Isaiah, who by way of distinction has been styled the Evangelical Prophet, likewise employs the same sublime symbol in addressing the church of his day concerning the hope of Israel: "The Redeemer shall come to Zion, and unto them that turn from transgression in Jacob, saith the Lord. Behold the darkness shall cover the earth, and gross darkness the people; but the Lord shall ARISE upon thee, and his glory shall be seen upon thee: and the Gentiles shall come to thy LIGHT, and kings to the brightness of thy RISING."

The same inspired Seer carried forward in the spirit

of prophecy, speaks of this event, in another place, as if already accomplished: "Arise, shine; for thy LIGHT is come, and the glory of the Lord is RISEN upon thee: the Lord shall be unto thee an everlasting LIGHT, and thy God thy glory: thy SUN shall no more go down."

Thus under the glorious figure of the "Rising Sun" did the prophets proclaim the advent of Messiah; and under the same image did those hail him whose happiness it was to welcome his appearing. The devout Simeon, coming into the temple at that happy hour, took the Holy Child Jesus up in his arms, and said, "Lord, now lettest thou thy servant depart in peace, for mine eyes have seen thy Salvation, which thou hast prepared before the face of all people; a LIGHT to lighten the Gentiles, and the glory of thy people Israel."

So the Evangelist: "There was a man sent from God, whose name was John. The same came for a witness, to bear witness of the LIGHT, that all men through him might believe. He was not that LIGHT, but was sent to bear witness of that LIGHT. That was the true LIGHT which lighteth every man that cometh into the world."

And Christ himself, once and again, in his addresses to the Jews, claims and appropriates this symbol as his own: "I am the LIGHT of the world." Again, "I am come a LIGHT into the world, that whosoever believeth on me should not abide in darkness." Again, "Yet a little while is the LIGHT with you; walk while ye have the LIGHT, lest darkness come upon you." Again, "While ye have the LIGHT, believe in the LIGHT, that ye may be the children of LIGHT."

From these and other passages we see what prominence, what *pre-eminence*, indeed, is given in Scripture to Light, and to the Sun, the great fountain of light, as a *Symbol* of Christ the Sun of Righteousness. This was the last

Type chosen by the prophets, and it was the loftiest, for the whole realm of nature could supply them with no higher or sublimer. Of all visible objects the "Sun" is the most worthy emblem of the Great Supreme; of all events within the reach of human observation the "Rising Sun" is the most adequate representation of the appearing of the Son of God upon the earth; and of all created properties, those of the Sun, Light and Heat and Attraction, offer the most striking and instructive analogies of the character and offices of Christ, as the Saviour of mankind. And to these *analogies* the reader's attention is invited in the following pages.

# PART FIRST.

## *THE SUN AS THE PRIMARY GLOBE.*

### ANALOGY I.

*As the Sun is the centre, the light and the life of the system of Creation—so Christ, the Sun of Righteousness, is the centre, the light and the life of the system of Revelation.*

#### PHENOMENA.

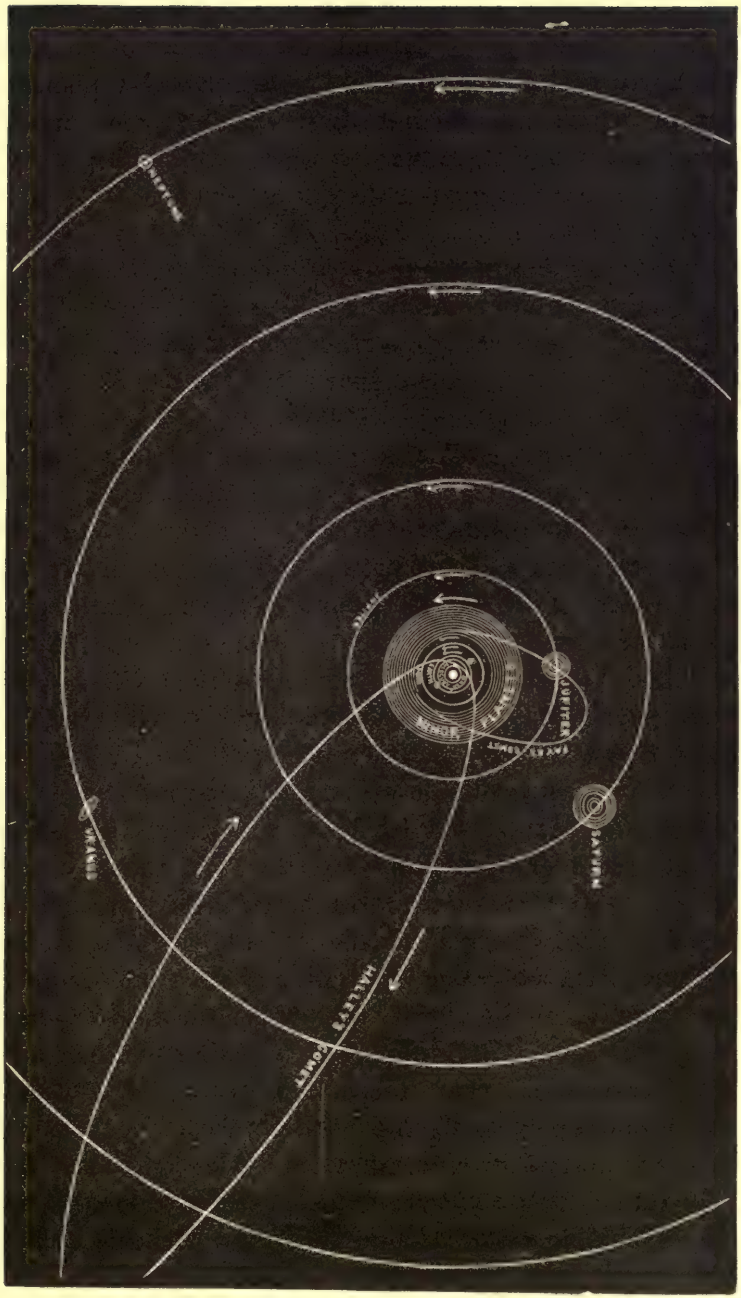
OF all objects in the visible universe there is none whose splendor is so great, whose revolutions are so grand, and whose benign influences are so widespread and generally appreciated, as the SUN. Every year, every season, every day, this glorious Orb pours down upon the Earth its warm and animating beams, dispelling the shades of night, diffusing joy and gladness among its teeming populations, and ministering in a thousand ways to the well-being of all its sentient and organized existences.

The Sun, as all at this day know, is the centre of a vast system of worlds, of which our own is one. This system is composed of eight *superior* planets, to which belong some twenty satellites or moons, and of more than two hundred *inferior* planets or asteroids. To all these

are to be added a great but unknown number of comets. The Earth ranks with the class called superior planets, some of which are smaller than it, and some much larger; and two of them revolve nearer to the Sun, while all the rest move at greater distances from him.

Our globe, then, is a member of a Family of Worlds, having its position in the midst of the household. Now, in a Family, whether we take the term in its scientific, or in its social import, we always expect, and, in fact, always find "family resemblance." And this is true of the planetary family; here we discover the most striking resemblance among all the members, so far as human observation can reach, in their forms and motions and characters. The points of similarity in these respects are so numerous and striking between the planet we occupy and the rest of the larger planets, that we are naturally and almost irresistibly led to the conclusion that these must have been created to subserve also the *same purpose* as our own, namely, to be the homes of so many intelligent populations. A mere summary of these points of likeness will serve both to prove and illustrate this.

To the Earth the Creator has given "two great lights;" and for the planets he has done the same thing; to all of them he has given the Sun to rule the day, and to several of them moons to rule the night. The Earth perpetually travels round the Sun, and the time occupied in accomplishing a complete circuit constitutes its year: the planets revolve around him in a similar manner, and thus measure out their respective years. The Earth turns round upon itself, thus with each rotation presenting every part of its circumference to the light and heat of the Sun: the planets are found to do the same, and to enjoy a similar alternation of light and darkness. The Earth revolves in an elliptical orbit, and upon an inclined




THE SOLAR SYSTEM.

axis; an arrangement which gives it a variety of climates and a regular succession of seasons: the planets revolve in similar orbits, and upon axes similarly inclined, which secure to them a like difference of climates, and the same agreeable vicissitudes of seasons. The Earth is encompassed by an atmosphere which refracts the light and retains the heat of the Sun: the planets likewise, at least some of them, have their atmospheres, creating for them morning and evening twilight, and producing currents or winds that sweep over their surfaces. The atmosphere of the Earth is charged more or less with clouds, which often assume every shade of color, change their forms and positions, and send down refreshing showers: the atmospheres of the planets also have their shifting clouds of various shades and tints, and which may minister to them, as ours to us, all the bloom and luxuriance of vegetation. The cloudy vapors of the Earth around its poles in winter condense and fall in the form of snow: a similar fleecy mantle has been observed to cover the polar regions of one of the planets, at least, during winter, and to vanish on the return of summer. The surface of the Earth is made up of land and water; and the planets which admit of such observations present appearances strongly indicative of the existence of oceans and continents, bays and promontories, similar to our own. The land portion of the Earth is ridged with mountains and scooped with valleys: the surfaces of the planets distinctly exhibit similar inequalities of surface. Various material elements found in the composition of the Earth enter also into the composition of the planets. In short the planets seem to possess all the arrangements which constitute our own a habitable globe. Now who can contemplate all these striking analogies—all these close resemblances—in so many particulars to the planet

we inhabit, and not be impressed with the high probability, not to say certainty, that those other planetary orbs, which nightly roll over our heads, must also be so many spacious worlds; and that like our own, they teem with life and intelligence!

In this magnificent System of Worlds, the Sun occupies the central and supreme position. His first and most important office is to *govern* them; in other words, to preserve them in their proper relations of times and distances, retaining every globe in its appointed orbit, and carrying it through its round in its determinate period. This he does by his powerful attraction, operating with undeviating exactness and uniformity; so that in the perfectly harmonious revolutions and rotations of these heavenly bodies we have what the ancients, by a beautiful figure, termed "the music of the spheres."

The Sun's second office is *to give light.* This resplendent orb is the grand fountain of illumination to all the planets and satellites of the system; in themselves none of these possess any light. To his beams our world owes all the light it enjoys, all the diversity of shade and coloring that charm its landscapes, or distinguish its living tenants, or beautify its overspreading vegetation.

The third office of the Sun is *to give out heat.* He is the radiating centre of warmth to the whole system. From him the earth derives the vital heat that constitutes it a fit abode for living beings. The warm and illuminating rays of the Sun are the twin stimulants of vital force, and without them life would be impossible upon our planet.

Such is the Sun in the great system of creation. How important his functions, how inestimable his benefits! It would be impossible to describe or even to enumerate all the blessings he daily diffuses over our own planet alone.

How he enlightens, warms, fructifies, adorns, blesses! What a circle of beneficent changes, what enchanting renovations, does he annually effect over the whole face of Nature! What life and joy does he inspire! How he fills the air with songs, and field and garden with fruit and fragrance! How he clothes the wood with foliage, and the meadows with grass! How he fills the valleys with corn, and makes the little hills rejoice on every side! How he covers the earth and crowns the year with his goodness! Worthy emblem, beautiful symbol of the more glorious Sun of Righteousness, from whom all spiritual life and light and comfort flow to men!

The world has had many benefactors whose worth was never known till after they had been removed from it. And the inestimable services of the Sun, perhaps, will be better appreciated by contemplating what would follow should his beneficent influences cease, or be withdrawn. Let us, then, for a moment, indulge in such a supposition, as that, on a fixed day, at noon, the *light* and *heat* of the Sun should be suddenly extinguished. What would be the consequences of such an appalling event? Nothing less than the immediate extinction of all life and the destruction of all organized existences. This may need a word of explanation to some.

There is always in the earth's atmosphere a certain percentage of moisture, or invisible vapor. This is drawn up and suspended by the heat of the Sun. To this moisture the atmosphere owes its power of confining and cherishing the earth's heat, which is always endeavoring to escape from its surface into space. "Aqueous vapor," says Prof. Tyndall, "is a blanket, more necessary to the vegetable life of England than clothing is to man. Remove for a single summer-night the aqueous vapor from the air which

overspreads this country, and you would assuredly destroy every plant capable of being destroyed by a freezing temperature. The warmth of our fields and gardens would pour itself, unrequited, into space, and the sun would rise upon an island, held fast in the iron grip of frost." *

What then would ensue, if, according to our supposition, the heat and light of the Sun should be cut off from the whole globe? All evaporation would immediately cease, and every particle of moisture already in the air would begin to descend. Forty-eight hours, according to Sir John Herschel, would suffice to precipitate every atom of moisture from the air; † which, at first, would fall in deluges of rain, and afterwards in piles of snow; and as a necessary consequence of this precipitation, there would set in an intensity of cold such as the highest peaks of the Himalayas or the bleakest regions of the Arctic never knew—a cold that would congeal to their lowest depths all the seas and oceans of the globe! The prevailing temperature would be more than 200° below zero (Fahr.)—a degree of cold which no animal or vegetable could resist or endure for an hour, any more than they could survive so long in a blazing furnace; and our present fair world would be wrapped in horrors tenfold past those of the poet's vision of *Darkness:*

> I had a dream, which was not all a dream—
> The bright Sun was extinguished, and the stars
> Did wander darkling in the external space,
> Rayless and pathless; and the icy earth
> Swung blind and blackening in the moonless air;
> Morn came and went—and came, and brought no day.
> . . . . . The world was void,
> The populous and powerful was a lump,
> Seasonless, herbless, treeless, manless, lifeless,
> A lump of death—a chaos of hard clay.

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* *Heat as a Mode of Motion*, p. 316. † *Familiar Lectures*, p. 48.

. . . . . The abyss was without a surge—
The waves were dead; the tides were in their grave,
The moon, their mistress, had expired before;
The winds were withered in the stagnant air,
And the clouds perished; Darkness had no need
Of aid from them—she was the universe!—*Byron.*

Such would be the dismal condition of our globe; and, in the event supposed, all the other globes of the system, doubtless, would be involved in a similar fate.

Let us now carry our supposition a step further. All light and heat having been extinguished, the earth, and also the other planets, would still continue as before to circulate in darkness around the blackened sphere of the Sun. Let us then, again, imagine, as before, the sudden and complete extinction of his *attraction*, or that he is annihilated. What would now result to these dead and dark and frozen globes? From that moment each planet, the earth like the rest, would forsake its orbit, and fly in a straight course into infinite space, in the direction in which it happened then to be moving; one would rush toward the West, another toward the East, and a third toward the North or the South; and all would wander, aimless and lost, through the boundless void of space. The annihilation of the Sun, or of the Sun's attraction, therefore, would be the loosening of the bonds of nature, the scattering of planets and satellites, and the destruction of the entire system. Thus does it appear that the Sun is the ruling and preserving power, and the light and the life of the whole system of Creation.

## Teachings.

Important as the Sun is to the unity, harmony, and welfare of the system of Nature, it is not more so than Christ is to the system of *Revealed Truth.* In the Holy Scriptures,

HE *is the central and supreme orb, the* SUN OF RIGHTEOUSNESS, *from whom all life and light and blessings flow.*

The Inspired Volume, like the solar system, comprehends many distinct parts—Histories, Laws, Ceremonies, Psalmodies, Prophecies, Biographies, Epistles, Revelations—but all these are related, and look toward one common centre.

The *History* of the Bible, beginning with the distant dawn of human existence, from every quarter of its horizon, converges toward that state of the world and condition of humanity which at last should mark "the fulness of time," when the Sun of Righteousness should arise upon a benighted world. The long and varied succession of events recorded—the reigns of kings and the ministries of prophets, the rise of dynasties and the dissolution of empires, the calamities of war and the blessings of peace—all cluster and lie along the convergent lines of Divine plan and promise that were to meet and issue in that glorious event. With majesty of purpose and stateliness of march we behold Providence bringing forward every event and every agent—Egypt, Arabia, Tyre, Assyria, Babylon, Persia, Greece, Rome—each in the time and connections in which it best served to prepare the way for the introduction and establishment of the kingdom of God's Anointed.

Again: The *Sacrifices*, *Types* and *Ceremonies*, which prevail throughout the Scriptures, were designed, and were so constituted, as to point forward to the promised Messiah with a clearness and certainty that were not to be mistaken. The Seed of the woman bruising the serpent's head, the offering of Isaac on Mount Moriah, the slaying of the Pascal Lamb, the flowing Rock of Horeb, the Atoning Sacrifices and the Peace Offerings, the Symbolism of the Tabernacle in the

wilderness, the lifting up of the Brazen Serpent, the Cities of Refuge in the Promised Land, the Temple with its Altar and Ark and Mercy-Seat, the Morning and Evening Sacrifice, the Annual Feasts and Fasts—all these had clear reference to the promised Deliverer, the Lamb of God, the Victim of the Cross. To Him they owed all their significance, and from Him they derived all their value and all their interest.

The same is true of the *Prophecy* of Scripture. Predictions of the Messiah stand forth, prominent and conspicuous, over the whole plain of Inspiration. These were delivered at sundry times and in diverse manners; but in whatever place or period given, whether eastward in Eden or westward in Egypt, whether amid the noise and turmoil of the city, or in the solitude and silence of the desert; whether under the shadow of the Temple at Jerusalem, or beneath that of Sinai in the wilderness; each, like the needle to the pole, pointed forward to the coming Messiah, the one great hope and consolation of Israel. The voice heard in the cool of the day among the trees of the garden spake of a coming Seed. The encouragement given to Abraham to forsake his idolatrous kindred was that, from him should descend One in whom all the families of the earth should be blessed. Among the benedictions uttered by Jacob on his dying bed was the prophetic promise, "The sceptre shall not depart from Judah, nor a lawgiver from between his feet, until Shiloh come." In his parting address to Israel, Moses was inspired to say, "The Lord thy God will raise up unto thee a Prophet from the midst of thee, of thy brethren, like unto me; unto Him ye shall hearken." The rebuke administered to Balaam for his madness against Israel was by a vision of a "Star coming out of Jacob, and a Sceptre rising out of Israel." The only

comfort which Job could find in the depths of his suffering and sorrow was the assurance, "I know that my Redeemer liveth, and that he shall stand at the latter day upon the earth." David, likewise, in the full tide of his victories and prosperity, predicts the greater conquests and more glorious kingdom of the Lord's Anointed One: "Yet have I set my King upon my holy hill of Zion. I will declare the decree; the Lord hath said unto me, Thou art my Son; this day have I begotten thee. Ask of me, and I shall give thee the heathen for thine inheritance, and the uttermost parts of the earth for thy possession." As time advances, and the great advent draws nearer, the utterances of prophecy become more clear and definite. Isaiah, speaking some three centuries later than David, says, "Unto us a Child is born, unto us a Son is given: and the government shall be upon his shoulder: and his name shall be called Wonderful, Counsellor, The Mighty God, the Everlasting Father, the Prince of Peace:" and in the last twenty-seven chapters of his book, this prophet unrolls a picture of the Messiah—of his character, labors, sufferings, death and burial—complete in all its parts. Daniel still later, and afar off at the court of Babylon, delivers predictions concerning Christ and the setting up of his kingdom, that seem almost like histories written after the events had taken place. Haggai and Zechariah also speak of his coming after a similar manner. And Malachi, the last of the prophets, says, "Behold, I will send my messenger, and he shall prepare the way before me: and the Lord whom ye seek, shall suddenly come to his temple, even the messenger of the Covenant, whom ye delight in: behold He shall come, saith the Lord of hosts."

Thus we find that promises, types, visions, symbols, or predictions of Christ, the Messiah, pervade every book,

and permeate the whole substance of the Old Testament Scriptures. And if from the Old we advance to the *New Testament*, we pass as it were from the orbit of one of the outer planets to that of the innermost, where the effulgence of the central orb fades every other object out of view. *Here* we stand in the unveiled presence of the Son of God, whom so many prophets and righteous men desired to see, but did not see; and to hear, but did not hear.

In the New Testament, Christ is all in all. The *Gospels* are but the narratives of the life of Christ. *The Acts* is but the history of the apostles of Christ. The *Epistles* are but instructions addressed to the churches of Christ. All the *doctrines* of the New Testament are founded on Christ; all its *promises* proceed from Christ; all the *hopes* it inspires look to Christ; and all the *heaven* it reveals is to be with Christ forever.

Christ, then, is the central Truth in the Sacred Volume —the Divine Orb that illumines its every page, that gives meaning to its every symbol, and life to its every service. Take away Christ from the Bible and it becomes a dark and dead letter. Extinguish the idea of a coming Messiah, and the Old Testament is a book without meaning; its every sacrifice is without signification, its every type without import, its every symbol without an object, and its every prediction a sound without meaning. Blot out the atoning sacrifice of the Cross, and the New Testament, likewise, becomes a Gospel without hope; every ordinance is without life, every promise without foundation, and every hope built thereon doomed to eternal disappointment. Take away Christ, and Him crucified, from the Sacred Scriptures, and you take away the Sun from the system, and leave it without a centre to attract, without light to illumine, and without heat to animate, and reduce the whole to darkness, disorder, and meaningless confusion.

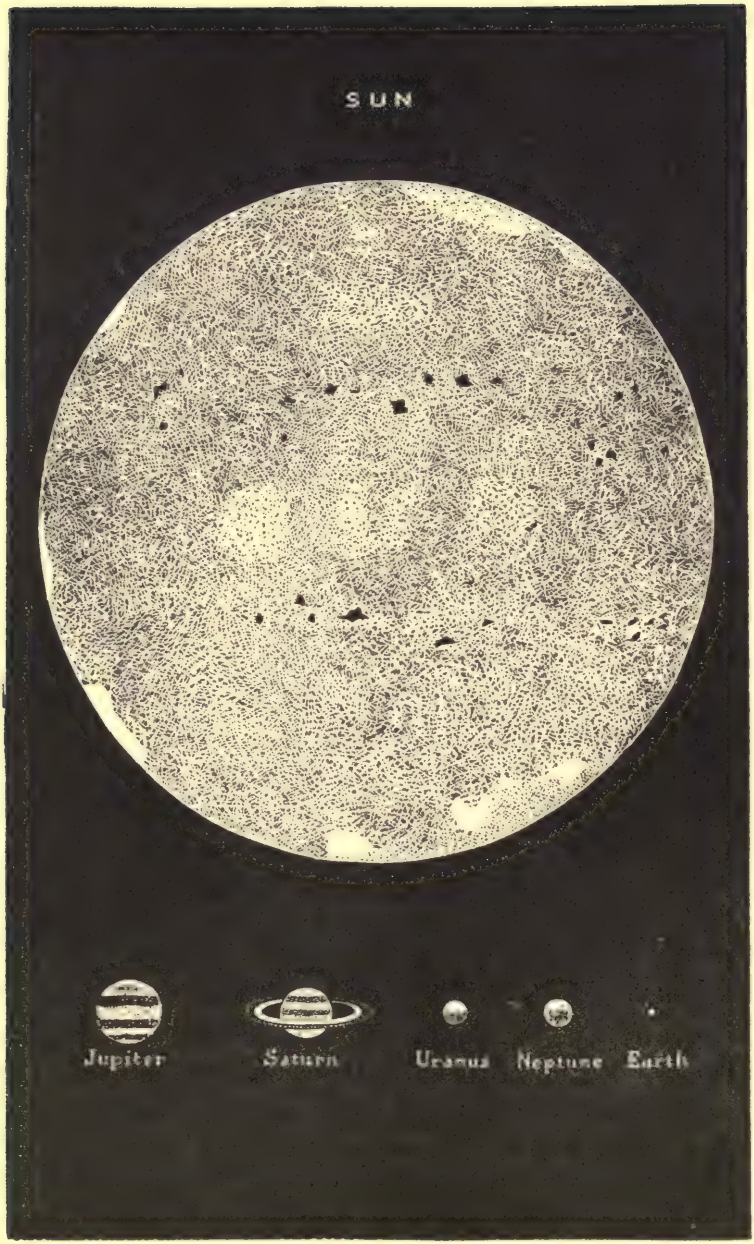
## ANALOGY II.

*As the Sun far surpasses all the other globes in the system both in magnitude and splendor—so Christ, the Sun of righteousness, infinitely transcends all created beings in wisdom, and power, and glory.*

### PHENOMENA.

To multitudes of the human race, the Sun is nothing more than a warm and luminous circle of a few inches in diameter, hung in the firmament, like a brilliant lamp, to give them light from day to day to prosecute their needful toils. And to many of a higher and better-instructed grade, he is but little more; they have never made an earnest or serious attempt to enter into the sublime ideas connected with the distance, magnitude, and splendor of this august luminary. They are content to look upon it, and content to regard its daily circuits, as "things of course."

Among that inquiring and philosophic people, the Ancient Greeks, there arose at an early day frequent and earnest discussions as to the real size of the Sun. Some maintained that it was exactly as large as it appeared to be. Others held that it was a far larger body in reality than its apparent size seemed to indicate; Anaxagoras hazarded the opinion that the extent of his disk might be equal to that of all Greece; for this, however, he was laughed at. Earnest and profound thinkers, regardless of such ridicule, went ere long still further; and Anaximander had the courage to assert that the Sun was not less than twenty-eight times as large as the earth. Bold and extravagant as such an opinion must have then appeared, yet, as we at this day know, it fell infinitely short of the truth. The entire territory of Greece at the distance of the Sun would be absolutely invisible; and the whole globe of the Earth, if laid upon his disk, would be




THE SUN AND PLANETS COMPARED.

but the minutest speck, covering only *one*-13,000th part of his apparent surface.

The reason, of course, why the Sun, though a globe of such vast magnitude, yet appears so small, is *its immense distance.* The measuring of this distance has been found a matter of great difficulty, requiring the utmost refinement of accuracy in the observations taken for the purpose. For a long time the distance of this great luminary was put down at ninety-five millions of miles; but subsequent investigation showed this estimate to be somewhat too high. The official astronomers of Great Britain, from calculations based upon observations of the late transit of Venus, have reported to Parliament the mean distance of the Earth from the Sun to be 92,400,000 miles. This may now be regarded as correct and finally settled.

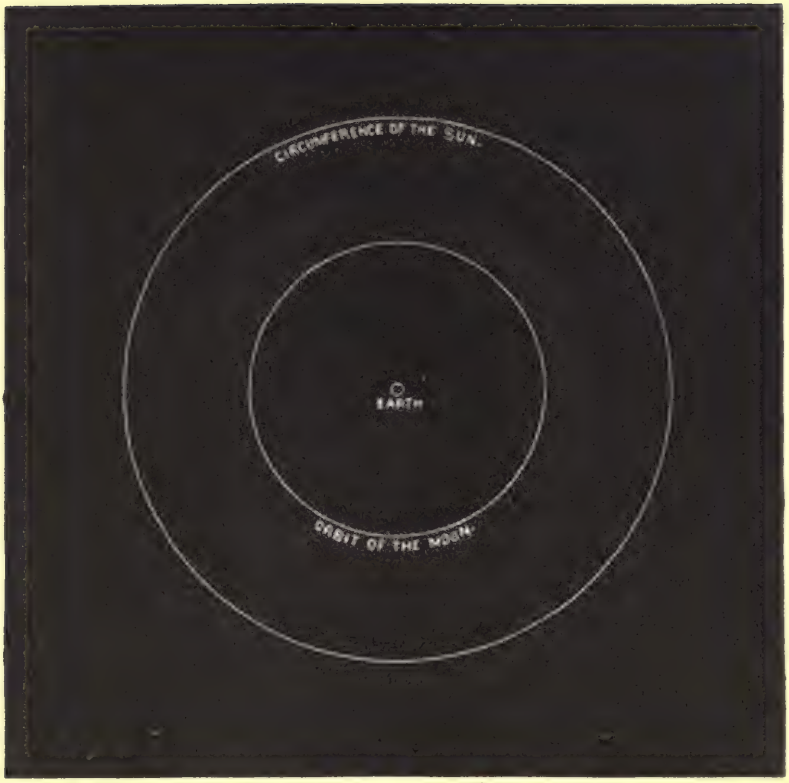
But accurate and reliable as this calculation may be, who can form a definite conception of such a distance as ninety-two *millions* of miles! We can have a clear idea of 1,000, or even of 10,000 miles; but our conception of 100,000 is much less clear, and when we rise to a million it becomes vague; and ninety or one hundred millions is utterly beyond the grasp of the mind. The following illustrations, therefore, are offered as aids to form some adequate idea of our distance from the great orb of day. A railroad train, running at the speed of thirty miles per hour, without stop or interruption, would travel around the earth in thirty-five days; and running at the same rate it would arrive at the Moon's orbit in eleven months; but to reach the Sun it would require no less than 351 years. Take another comparison: The ball of an Armstrong cannon leaves its mouth with a speed that will carry it through a mile in four seconds; yet moving uniformly at this tremendous velocity, that ball would require nearly twelve years to reach the Sun; and the

sound (supposing it to travel with the same speed as it does through the air) would not arrive till some six months later. What then must be the chasm that separates us from our great Luminary! Viewed from this immense distance, the vast surface of 600,000 *millions* of square miles, which it presents to us, is contracted to the small disk of a foot's diameter.

Such being the distance and apparent size of the Sun, let us now contemplate its actual *bulk and dimensions.* The diameter of the Earth is 7,925 miles, to us an immense globe; but the diameter of the Sun is 108 times greater, or 855,000 miles. The surface of our world measures 198,900,000 square miles; but the surface of the Sun is 11,800 times greater. The solid contents, or volume, of our globe amounts to 263,858,000,000 cubic miles; but that of the Sun is 1,275,000 times greater. These are figures soon written, and dimensions easily read, but who can have a clear comprehension of them? The mind staggers in its attempt to grasp the ideas they express. Let us then resort again to comparisons that may offer us some help in our effort.

If, like Mont Cenis, the earth were tunnelled through its centre for a railroad, a train running at the speed of thirty miles per hour, without stopping, would reach the central point of the Earth in five days and a half, and pass from side to side in eleven days; but to reach the centre of the Sun in a similar way and at the same speed would require full twenty months, and to pass through it three years and four months, and to travel round it no less than ten years.

The globe we inhabit is an immense ball, its equator being a circle of very nearly 8,000 miles in diameter; around the Earth revolves the Moon, describing a far mightier circle, at the distance of 238,793 miles; now




**THE SUN'S PERIPHERY AND THE MOON'S ORBIT.***

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* Amédée Guillimin, a distinguished French astronomer, employs the following comparisons to illustrate the magnitude of the Solar Globe. "Suppose that we represent the Sun as a sphere having a diameter of 4 inches, the earth will then have to be represented as a minute grain less than 3-100ths of an inch in diameter, which we must place at a distance of 22½ yards from the former, to place its real size and distance from the Sun in harmony one with the other. If the earth be represented by an ordinary geographical globe, such as are used in schools, the diameter of which is about 1 foot, the Solar Globe to correspond must be placed at a distance of 2¼ miles, and be represented by a great sphere 35 yards in diameter. Jupiter, the largest of the planets, would likewise be represented by a globe 3½ yards wide, which would have to be placed at 11 miles distance; Saturn would be a globe 3¼ yards wide placed at a distance of 20 miles.

let us suppose the earth to be enlarged until it completely fill this orbit of the Moon, and what a stupendous globe it would then be! Yet to be equal to the Sun it would have to swell out on every side 188,000 miles even beyond this orbit! "Were the Sun a hollow sphere, perforated by a thousand holes to admit the twinkling of a luminous atmosphere without, like so many stars; then a globe as large as the Earth might be placed at the centre, with a satellite as large as the Moon, and at the same distance from it as she is now from the Earth; and there would be presented to the eye of a spectator on the interior globe a universe as extensive as the whole creation was conceived to be in the infancy of astronomy, and as splendid as the heavens appear at present to the uninstructed gazer."

To convey an idea of the surpassing magnitude of the Sun, and of the diminutive proportions of the planets as compared to him, Sir John Herschel makes the following comparison: On a perfectly smooth surface place a globe two feet in diameter, and let this represent the Sun; then Mercury will be represented by a *mustard-seed*, Venus by a *pea*, the Earth by a *pea* also, Mars by a *pin's head*, the Asteroids by *grains of sand*, Jupiter by an *orange*, Saturn by a *smaller orange*, Uranus by a *cherry*, and Neptune by a good-sized *plum*. Such is the transcendent magnitude of the Solar Orb as compared with its encircling planets.* (Compare Plate, page 51.)

Leaving now the Sun's magnitude or volume, let us contemplate his *mass* or *weight*. Incredible as the statement may sound to many, yet it is true, that Science has weighed the stars. The astronomer can as readily determine the weight of a planet or satellite as the engineer can compute the weight of a block of granite, or truss of

* *Outlines of Astronomy*, Art. 526.

iron, that is entering the structure that is being reared under his direction. Now, it is found that if the Sun were put in the astronomer's scales, it would balance no less than 330,000 globes such as our earth is; and would outweigh all the globes of the system, planets and satellites put together, more than 700 times; and his attracting power, consequently, is also 700 times greater. Such is the superiority of the great Central Orb.

Again: the Sun, in like manner, excels in its *splendor*. No orb in the firmament of heaven, and no light that exists, or can be produced on the face of the earth, can be compared to the brightness of the Sun. The most intense light that can be artificially produced, viewed upon the bosom of the Sun, appears as a dark shadow. Even the vivid lightning can but faintly manifest its existence in the unobscured presence of the Sun. In the night season the constellations are bright and sparkling, the morning star glitters and dazzles like a great diamond, and the full moon illumines the whole concave—but when the Sun, the great Lord of Day, arises, how constellations, and morning star, and refulgent moon, all pale and fade out of view. Wollaston estimated that twenty *millions* of stars as bright as Sirius would not shed upon the earth a degree of light equal to that of the Sun. It has also been calculated that were the whole heavens covered with full moons, their united light would be far from amounting to the brightness of the Sun.*

Such is the great Luminary of Day, and so far does it surpass all the planetary globes in magnitude, and power, and splendor. How grand a Centre! how worthy a Ruler of the great system! In it we behold a display of

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* The interesting subjects connected with the Sun's Light and Attraction, here briefly named, will be found set forth at length in the *Analogies* embraced in Parts II. and IV. See especially Part II., Analogy 12.

Omnipotence which awes our minds, and overwhelms our conceptions! Who, when he reflects upon its vastness and its glories, but must raise his thoughts in wonder and adoration to HIM who in the beginning launched forth its mighty globe from his hand, and kindled up the brightness of its beams with the breath of his mouth.

## TEACHINGS.

Great and glorious as the Solar Orb is, it is but an emblem—an emblem only—of more exalted greatness and glory. As the Sun thus far surpasses all the other globes of the system in magnitude and splendor, so *Christ the Sun of Righteousness infinitely transcends all created beings in wisdom, and power, and glory.*

Here, it must at once be observed, we enter upon the consideration of a subject that is purely one of *revelation.* Of the person and character of Christ, as the Son of God and Saviour of the world, we know nothing beyond what we learn from the inspired Word. Here reason is impotent and science inapplicable; all our philosophy can discover nothing beyond what is revealed. The Holy Scriptures are our only source of information.

What then do the *Scriptures* say concerning him? They declare him to be a Divine Being; they apply to him all the sacred titles that belong to God; they speak of him as possessed of all the attributes which pertain to God; they ascribe to him all the actions of which God alone is capable; they represent him as sustaining the same relations to angels and to men as God sustains; they require that the same worship be rendered to him as is rendered to the Everlasting Father; they declare him to be God blessed forever.

What, in particular, do the *Prophets*, those holy men of old who wrote and spoke as they were moved by the

Holy Ghost, say of him? They say, "He is Jehovah's Son." "His name shall be called Wonderful, Counsellor, The Mighty God, The Everlasting Father, The Prince of Peace." "I saw the Lord sitting upon a throne, high and lifted up, and his train filled the temple: above it stood the seraphim; and one cried to another and said, Holy, holy, holy is the Lord of hosts; the whole earth is full of his glory." These things said Isaiah, when he saw his glory and spake of him.

What do the *Apostles*, the men who were his associates while on earth, who listened to his discourses and witnessed his mighty works among the people—what do they say of him? "He was in the beginning; all things were made by him, and without him was not anything made that was made." "By him were all things created that are in heaven, and in earth, visible and invisible, whether they be thrones, or dominions, or principalities, or powers; all things were made by him and for him; and he is before all things, and by him all things consist." "In him dwells the fulness of the Godhead bodily."

And the *Angels*, those ministering spirits that stand continually in his presence—in what light do they view and with what feelings do they regard him? They call him *Lord*, and they fall down and worship him, saying, "Worthy is the Lamb who was slain; salvation to Him who sitteth on the throne, and to the Lamb for ever and ever."

With reverence let us inquire what this *Christ* saith of himself. "I am the first and the last." "I proceeded forth and came from God." "Whatsoever the Father doeth, the Son doeth likewise." "I and the Father are one." And again he saith, "I am the light of the world." What must be the nature and dignity of him who can thus stand up and say, in the face of the Sun,

"I compare claims with that great fountain of light!" What must be his own conception of his greatness and value, when he can thus seek to eclipse the noonday Sun, and challenge for himself the attention of the world!

With equal reverence let us, once more, ask what saith the *Divine Father*. Unto the Son he saith, "Thy throne, O God, is for ever and ever; a sceptre of righteousness is the sceptre of thy kingdom." Again, when he bringeth in the first-begotten into the world, he saith, "And let all the angels of God worship him." Again, when he was baptized, Jesus went up straightway out of the water: and, lo, the heavens were opened unto him, and there came a voice from the excellent glory, saying, "This is my beloved Son, in whom I am well pleased." Again, when he raised him from the dead, "He set him at his own right hand in heavenly places, far above all principality and power, and might, and dominion, and every name that is named, not only in this world, but also in that which is to come, and hath put all things under his feet, and gave him to be the Head over all things to the Church."

From all these sacred and solemn testimonies it is manifest that, as the material Sun is the first and governing orb in the system of creation, so the Sun of Righteousness is the supreme Ruler and Lord in the spiritual Universe. He is Head over all. All holy intelligences, whether in heaven or on earth, recognize him as their Creator and God. All honor the Son as they honor the Father. Seraphs bow down before him; angels find their chief joy in beholding his face; and the innumerable armies of the Redeemed ever congregate around his throne, to pay their most devout and joyous homage there. "And I beheld, and I heard the voice of many angels round about the throne: and the number of

them was ten thousand times ten thousand, and thousands of thousands; saying with a loud voice, Worthy is the Lamb that was slain to receive power, and riches, and wisdom, and strength, and honor, and glory, and blessing. And every creature which is in heaven, and on the earth, and such as are in the sea, and all that are in them, heard I, saying, Blessing, and honor, and glory, and power be unto him that sitteth upon the throne, and unto the Lamb for ever and ever."

Lord of lords, and King of kings! let all rênder unto HIM the praise due unto his name, and let the whole earth be filled with his glory.

## ANALOGY III.

*As the Sun was active and influential in preparing the earth to be a fit habitation for man, unnumbered ages before he was called into being—so the Sun of Righteousness, from the depths of eternity, contrived, and in the purpose of his love executed, the wondrous scheme of man's redemption.*

### PHENOMENA.

THAT the origin of our globe dates from a time far anterior to that of the human race is a fact now well established and generally received. While the creation of the substance or material of the earth, "in the beginning," was an instantaneous act, yet its formation into a *world*—the elevation of its continents and islands from the deep, the formation and accumulation of its soil, the growth of its vegetation, and the introduction of its living tenants—was the work of time, progressively carried on through very long periods, periods probably as much greater than the ages of human history as the distance of the planets is greater than the distance of the clouds. This

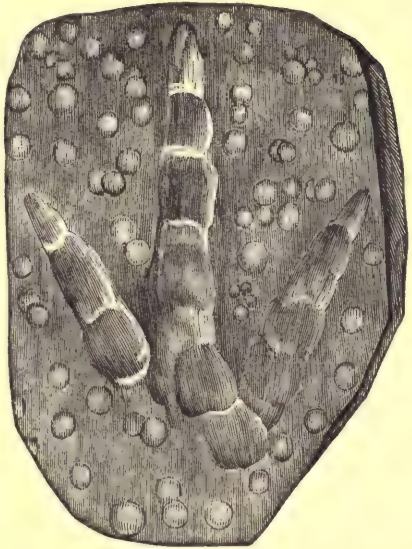
is attested by the vast *Formations* of its rocky crust, which speak of a succession of stupendous revolutions, and by the innumerable *Strata* of each of these formations, which, like so many leaves of a book, are covered over with inscriptions relating, in hieroglyphic but legible characters, the history of countless generations of plants and animals that successively lived, died, and passed away.* From calculations made by Sir William Thomson, it would appear that to reach the date at which the earth first attained a solid crust would require us to travel back in time between seventy and a hundred millions of years; and to recede still beyond through all its molten and fluid changes, and reach its vaporous origin, would require as many more millions of years. Such a lapse of time, indeed, is to us, the creatures of a few fleeting days, all but inconceivable; but to him who inhabits eternity, a thousand years or a thousand ages are as one day—to him all time is one eternal *Present.*

Now, old as the Earth may be, *the Sun must be older.* The earth being a globe dependent on the Sun, reason tells us that the Sun must have existed before it, just as the tree must have existed before the fruit which hangs from its branches. But *how long* the Sun existed before the earth we have no grounds even for conjecture. If what is known as the "Nebular Theory" of the origin of the system is to be received, the Sun is the Parent of the whole planetary family, and the earth is among the youngest of his offspring, for it was among the last thrown off from his mighty circumference. But we leave such high speculations, and take our stand on safer ground. We have clear evidences, not only that the Sun existed, but that he also enlightened, and warmed, and

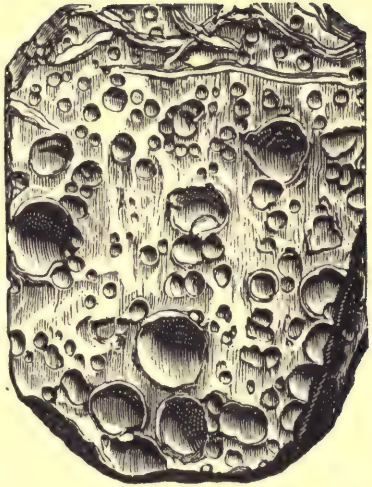
* For a consecutive history of the Earth's pre-Adamite condition, see a work by the author, entitled *Work-Days of God, or Science and the Bible,* pp. 25-164.

RAIN-MARKS OF GEOLOGICAL PERIODS.

In the Cambrian Period.



Red Sandstone Period.



Formed, July 21, 1849.

ruled our globe, as he does at this day, from the earliest geological periods. These evidences we find in the Record of the Rocks, and of which we can here instance but a few.

We have a conclusive proof that the Sun shone upon the earth, and that its light was subject to the same laws of refraction and reflection in those remote periods as at present, in the *Eyes* of petrified animals. The Eye is an organ formed with specific reference to the light of the Sun, and therefore proves its existence. Now these petrified eyes, in numerous instances, have been preserved for us in wonderful perfection, even to their most delicate parts. The Trilobites, which were among the earliest of living things, and which inhabited the seas of the immeasurably remote Cambrian Period, had eyes, and eyes of the most complicated character. The heads of all fossil fishes and fossil reptiles in every subsequent geological formation exhibit the cavities where the eyes were planted, and not a few of them the perforations through which the optic nerves passed into the brain.

We have another proof of the presence and heat of the Sun, in those early eras, in petrified *Rain-marks*. These are pits made by the large drops of a passing shower in the soft mud recently left bare by the tide; these impressions, exposed to the warm air, soon dried and hardened; and being afterwards covered by layer on layer of silt, by subsequent tides, were in process of time turned into rock; and in this way have been preserved unchanged through countless ages. Sometimes the pits are of a slanting form, and thus show, not only that the drops were driven by a strong wind, but likewise the direction in which that wind blew. These Rain-impressions have been discovered in the early Cambrian rocks, and in many of the subsequent geological formations.

Thus we have in these ancient periods clear evidence of the action of tides, of winds, of heat, and of rain—actions in all of which the Sun must have been concerned, just as he is concerned in the same operations at the present day.

Again, the presence of the Sun, in all its genial influences, is sufficiently attested by the *Vegetation* which has occupied the earth's surface through every period of its geological history, for its light and heat were indispensable to the growth and reproduction of every tree, and herb, and blade of grass which went to make up that vegetation.

In connection with vegetation, the Sun produced many results of inestimable importance to coming man. To the Sun the earth owes its covering of *rich and productive soil.* Its earliest soil was little else than triturated rocks, coarse and poor, and capable of bearing only very low grades of vegetation. But each growth, low as it was, by its decay, left that soil a little better. This process of growth and decay, repeated and continued, served at length to cover the ground with a coating of mould capable of producing the higher types of vegetation. Thus through the annual rounds of the Sun's influence the earth was fitted to yield the herbs, and fruits, and cereals which the nature of man would require for his sustenance.

To the Sun the earth owes also its *pure and wholesome air.* There was a time in the history of our globe, when its atmosphere contained a much greater amount of carbonic acid gas than it does at present—an amount that rendered it utterly unfit for human lungs. When at length a sufficient quantity of soil had been formed, in the way just described, vegetation came to abound more and more. Under the stimulating power of the Sun's

light and heat gigantic plants shot forth from the warm ground. Grotesque trees, delicate ferns, huge mosses, and tall reeds formed dense forests of vegetation in all latitudes from the equator to the poles. "These flourished luxuriantly in the atmosphere that was so rich in carbonic acid, the carbon of the carbonic acid passed over into the form of wood, and thus in the course of thousands of years it was continuously diminished. Revolutions of the earth's surface succeeded; whole territories with their forests were buried under sand and clay beds, and, becoming decomposed, were changed into coal. A fresh vegetation sprouted forth from the newly-formed soil, and again absorbed, under the influence of light, the carbonic acid of the atmosphere, to be once more engulphed by a fresh cataclysm. In this way the carbon from the carbonic acid of the atmosphere was stored as coal in the depths of the earth; and thus the atmosphere, by the chemical effects of the Sun's light and heat, became continually richer in oxygen, until at length, after countless revolutions of the earth, it obtained that wealth of oxygen which made the existence of man possible, when he appeared at the end of the earth's development." *

While the Sun was thus purifying and vitalizing the atmosphere, it was at the same time, in the way just described, filling the vaults and cellars of this "earthly house" with invaluable *stores of Coal*, for its coming occupant. The quantity of carbon thus extracted from the air and converted into coal was enormous. The area of the coal-fields of the United States alone is very great. That of Pennsylvania, Virginia, and Ohio, for example, extends continuously from northeast to southwest for a distance of 720 miles; its greatest breadth being 180 miles; its area thus amounting to 129,600 square miles.

* Vogel's *Chemistry of Light*, p. 81.

That situated in Illinois, Indiana and Kentucky embraces an area of 14,000 square miles, while several other extensive fields are found in Michigan and other parts of the Union. Great Britain is likewise richly endowed with deposits of coal. Fields more or less extensive are also found in France, Spain, Belgium and Germany; in India, China, the East India Islands, Australia and New Zealand; in Nova Scotia; in the Isthmus of Panama, Chili and Peru; in many of the Islands of the Pacific; in Greenland and in several of the isles that lie within the Arctic circle. In addition to all these, many deposits doubtless remain yet to be discovered. Thus by the beneficent design of Providence this important article was widely distributed over the face of the whole earth. And now who can estimate the value, or enumerate the benefits of these fields of coal? How many millions of homes to-day are made cheery by its glow? What aids to human industry does it render? What countless engines and machineries does it drive by day and by night? What grand operations does it carry forward on sea and land? But for the Sun none of these coal-beds had ever existed. But for the action of the Sun millions of years before he was placed on the earth, man had enjoyed none of these advantages.

To the Sun likewise the earth owes its great strata of *Rock-salt.* These were produced for the most part by the Sun's heat evaporating again and again the shallow but briny seas of the Triassic Period, thus leaving layer upon layer of salt, overspreading the whole extent of their basins, until in process of time thick beds of this very necessary mineral were deposited.

In short, the Sun was a prime agent in all the grand processes, mechanical and chemical, which carried forward the world's formation and improvement from its chaotic

condition to its final state of order, fruitfulness and beauty, when it received man, its destined heir and lord. Toward this happy consummation the Sun's bright and far-seeing eye, as it were, ever looked forward; and toward this its mighty energies, untired, ever worked in sea and land and air, till the world was finished, and all pronounced "very good."

## Teachings.

Results so important and far-reaching, wrought out in such ways and by such means, as those now described, are interesting and instructive subjects of study when considered simply in their scientific aspect; as we rise to the contemplation of the designing wisdom and prospective provision, which they plainly exhibit, they become invested with additional and sacred interest; and when we trace the analogy and type, which in them lie, of the infinitely more wonderful and important provisions of grace, they become at once inspirations to highest devotion—the pre-existent Orb of Day becomes a symbol of the pre-existent Saviour, the preparation made on earth a figure of the plan contrived in heaven, and the whole pre-Adamite history of the globe a grand parable, in which we behold *the Sun of Righteousness, from the depths of eternity, contriving, carrying forward, and accomplishing the wondrous scheme of human redemption.*

The hour that marked the Saviour's birth at Bethlehem was not the beginning of his existence, but the commencement of his manifestation in the flesh. He was in being, in happy and glorious existence, before he thus assumed our humble nature. He was before all things, and before all created beings. Thus speaks he of himself: "The Lord possessed me in the beginning of his way, before his works of old. I was set up from ever-

lasting, from the beginning, or ever the earth was. When there were no depths, I was brought forth. Before the mountains were settled, before the hills was I brought forth: while as yet he had not made the earth, nor the fields, nor the highest part of the dust of the world. When he prepared the heavens, I was there: when he set a compass upon the face of the depth: then I was by him, as one brought up with him: and I was daily his delight, rejoicing always before him." Elsewhere he saith, "I came down from heaven"—"I am from above"—"I had glory with the Father before the world was"—"I and the Father are one." "In the beginning the Word was with God, and the Word was God."

And from "the beginning," too, known unto him were all his works, which afterward he should accomplish. The creation of man, and the placing of him in a state of probation, were embraced in his plan before the world was. Nor was his *fall* unforeseen, together with all its fatal consequences. Accordingly the Scriptures, in diverse places, represent the scheme of man's redemption as occupying the Divine mind before the foundations of the earth were laid. When neither Sun nor moon had yet been created, nor star nor planet had twinkled in the heavens, to his prescient Spirit were clearly visible Eden in its bloom and loveliness, the creature to be made in his own image walking among the trees of the garden, Sinai from whence his Law should be proclaimed, Zion which should be crowned with his Temple, and Calvary which should sustain the mystery of his Cross.

> "His loving thoughts, from first, on our salvation ran—
> Ere sin was known, or Adam's dust was fashioned into man."

The Apostle Peter, referring to this profound mystery, saith: "Ye know that ye were redeemed with the pre-

cious blood of Christ, as of a lamb without blemish and without spot, *who verily was fore-ordained before the foundation of the world*, but was manifested in these last times."

More striking and emphatic still, if possible, is the statement made in the book of Revelation: "He was slain from the *foundation of the world*." The sacrifice of the Divine Victim, the Lamb of God, was so determined upon, and so certain, that the deed is here spoken of as having been virtually accomplished before the world began. In the counsel and purpose of the Deity, he *was slain* from the foundation of the earth. Hence the animal sacrifices offered through the long ages of the old dispensation recognized and represented this great atonement as already made and accepted in God's foreknowledge and eternal purpose.

Our blessed Lord himself, in describing the scene of the last judgment, couches the welcome that shall be given to the redeemed in these remarkable words: "Come ye blessed of my Father, inherit the kingdom prepared for you *from the foundation of the world*." These are words that plainly imply that their happiness had engaged the Eternal Mind before the world began; that he purposed it, planned it, secured it, ages before their existence.

We plainly see, then, that as the Sun was active, by his light heat and attraction, in preparing the earth to be a suitable and happy abode for man, unnumbered ages before he was called into being—so the Sun of Righteousness, from the depths of eternity, contrived, and in the purpose of his wisdom and love executed, the wondrous scheme of human redemption.

The facts and scriptures above adduced go to establish the general truth that, God works, both in the kingdom

of Nature and in the kingdom of Grace, according to a *Determinate Plan.*

In the Pre-Adamite history of the globe, through all its vast periods and mighty revolutions, there is an unveiling more and more, as time advances, of one grand and general plan; the adjusting of jarring elements into more and more harmonious co-operation; the carrying out and carrying upward of rudimental forms through various changes of structure and condition toward complete and beautiful systems of both plants and animals. The advancement of that plan is steadily pursued through all changes, its unity maintained through all variety, and its harmony through all details. This is the latest conclusion of science, for this truth it has found written upon the whole face of Nature. Science, true Science, is not a thing of man's *invention*, but man's deciphering and translating into human language the *thoughts* of the Creator, which are imprinted upon all his works. Science, said the distinguished Agassiz, "lies not in us, but in Nature, or rather in the *Plan* whose foundations were laid in the dawn of creation, and the development of which we are laboriously studying;—the great divisions under which we arrange the animal kingdom being but headings to the chapters of the great book which we are reading. The combination in time and space of all these thoughtful conceptions exhibits not only Mind,—it shows also premeditation, power, wisdom, greatness, prescience, omniscience, providence. In a word, all these facts, in their natural connection, proclaim aloud the One God, whom man may know, adore and love."* . . . . . .

Equally certain is it that Plan is pursued in the kingdom of God's providence and grace. "Known unto him are all his works from the beginning." Out of the depths

* *Essay on Classification*, Chap. I., sec. 1 and 32.

of eternity, he looked forward over all the periods of time, and clearly beheld all that those periods would witness or record, for his hand and counsel would be concerned in them all. The Divine Plan is not only all-embracing, but also, as the Scriptures assure us, *well-ordered in all things, and sure.* "Not more certainly is the earth perpetually speeding on its destined course through space, and carrying with it all the momentous interests of humanity, than the Redeemer's *plan*, freighted with an eternal weight of glory for the creature, and with a weightier revenue of glory to God, is in constant progress. Never for a moment does it retrograde—never pause—never linger. Look on it when he will, he beholds it arrived at that stage where, a thousand ages ago, he foresaw it would be; and look forward to what distant age he will, he beholds it, in anticipation, already there arrived. Hence he is often represented in Scripture as foretasting the happiness arising from the contemplation of this advancement of his plan. To its completion he looks forward with joy. The prospect of beholding a ransomed world—every heart a channel through which a fulness of delight is constantly streaming from the great Central Source, and every moment enlarging to receive more; every sin forgiven, every evil remedied, every want supplied; the whole reflecting, and replenished with the Divine glory—this is the consummation of that glory which is set before him."*

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* *Pre-Adamite Earth*, pp. 46, 49.

## ANALOGY IV.

*As the Sun is an orb of splendor too dazzling for the human eye to behold save through some softening or subduing medium—so the Sun of Righteousness in his absolute Divinity was a Being invested with glories overpowering and consuming, and could be contemplated by mortal man only through the softening veil of human flesh.*

### PHENOMENA.

No organ in the human frame is more exquisite in its mechanical parts, or more wonderful in its specific function, than the Eye. No organ combines so many scientific principles in its structure, or presents so many clear evidences of Intelligence being concerned in its production, or so loudly proclaims, "The Hand that made me is Divine."

The eye is an organ made with reference to an element altogether external to itself, whose chief source is millions of leagues distant; and constituted to convey to the mind, impressions of objects in the scenery of earth and sky which are of million forms and shades and distances. By means of this wondrous organ man is enabled, by the act of a single moment, to send an exploring look over the surface of an extended landscape, and to gather into his mind the images of all its diversified objects and features; or to direct an upward glance, and survey the glories of the innumerable worlds which replenish and adorn the infinitude of space.

In these sublime achievements, each particular part of the organ, of course, has its particular office to perform, and pre-eminently among them that called the *Retina*. This is a very delicate nervous membrane, less than the one-hundredth part of an inch in thickness, which lines the whole back part of the interior of the eye-ball, and constitutes the screen on which the lenses cast the pict-

ures of the external objects looked upon. The peculiar property of the retina is its sensibility to light, and its special function is the converting of the vibrations of the luminiferous ether, the physical basis of light, into a stimulus to the fibres of the optic nerve, which fibres, when excited, awaken the sensation of light in the brain.

The retina, as just stated, is a part of extreme delicacy, and its sensibility, or rather its excitability, is readily exhausted. Thus, looking at a very bright light suddenly renders that part of the retina on which the light falls *insensible;* and on turning the eye from the bright light towards a moderately lighted surface, a dark spot, arising from temporary blindness of the retina in this part, appears in the field of view. If we look for an instant at the sun, or even at an exceedingly strong artificial light, we feel for some seconds afterwards that the eye is partially blinded; it can no longer distinctly perceive surrounding objects; and if we are so imprudent as to continue the unnatural exposure, its blinding effect lasts for a long time afterwards. The eye, indeed, may even be permanently injured by too violent or long continued exposure of this kind.

Dr. Watson, in his *Lectures on the Principles and Practice of Physic*, speaks of a patient, who, unacquainted with the proper method of observing an eclipse of the sun, employed for that purpose a piece of opaque glass with a transparent spot in its centre. Notwithstanding the vivid and painful impression he experienced from the rays that passed through the lucid spot in the glass, he continued to look at the sun till the eclipse was over, using his right eye. He was soon afterwards seized with vertigo, and pain in the right side of the head, and found himself almost entirely deprived of the sight of the right eye. It is related in *The Life* of Sir Isaac Newton that, in the

prosecution of his celebrated experiments on Light, he suffered intensely in a similar way; he was in fact deprived of sleep for several days and nights together, and driven even to the verge of distraction. From the same cause an eminent Belgian philosopher became totally and permanently blind;—

> "He saw, till, blasted with excess of light,
> He closed his eyes in endless night."

So dazzling and overpowering is the great orb of day, and so inadequate is the eye of man to gaze upon its unobscured glories; if he would look upon it with comfort or with safety he must look through some softening or subduing *medium.* And this is what the experienced astronomer takes care to do in observing and studying this brilliant luminary. He employs a smoked or colored piece of glass, which so mitigates and reduces the intensity of its rays, that he can not only look upon its luminous face without pain or peril, but can even leisurely number and measure its spots, study its faculæ, and contemplate with wonder and delight the planets Venus and Mercury accomplishing their rare transits across its surface.

## Teachings.

As the Sun of Nature, in his naked splendor, is thus an orb of brightness too great for human vision to behold, *so the Sun of Righteousness in his absolute and eternal Divinity was a Being invested with glories and majesties altogether overpowering and consuming to mortal man.* When Moses, emboldened perhaps by the extraordinary privileges before accorded him, made the inconsiderate request, "Lord, I beseech thee show me thy glory," he was immediately answered, "Thou canst not see my face, for there shall no man see me and live." The vision would have been insufferable. The uncreated splendor

which pertained to the Deity would have whelmed and dissolved a tenant of flesh. The full, unclouded blaze of glory which constituted the shekinah, or visible symbol of his presence, would be more than mortal beings could endure. Even the partial display of this, which was made to Paul on his way to Damascus, struck him down to the earth, and wrapped him in blindness from which he did not recover till after three days. And this same apostle, writing many years after to his beloved Timothy, gives utterance to this sublime doxology, "The King of kings, and Lord of lords, who only hath immortality, *dwelling in light which no man can approach unto, whom no man hath seen, nor can see;* to whom be honor and power everlasting. Amen."

God, the uncreated and eternal, illimitable in his immensity, unchangeable in nature and character, irresistible in his power, escapeless in his gaze, inconceivable in his mode of existence, indescribable in his essence and majesty and glory—to such a Being man, sinful man, could only look up with awe and trembling. The ineffable perfections of this Almighty and Omniscient Deity, dwelling in the secret place of eternity, must ever have been overwhelming to his timid apprehension. Whatever pertained to, or proceeded from a Nature so far superior to his own, and so mysterious, must always have been regarded with awe, if not with terror. The Great Supreme, in his purely spiritual existence and absolute Divinity, was unapproachable to the faculties or to the imagination of man. His mental powers were too lowly to apprehend the excellency of his character, and his vision too feeble to contemplate the exceeding glories of his nature.

Those in the earlier ages of the world—the Magi of Babylon, the Priests of Egypt, and the Philosophers of Greece and Rome—who attempted to scan the nature of the

Deity, as with naked eyes, turned them away, as from the sun, filled with *ocular spectra*, or false and imaginary impressions, and ascribed to him features of character calculated to inspire equal terror, hatred and disgust. Human intellect could not conceive the Divine perfections. Correct views of God, as of the solar orb, are to be gained only through a softening and subduing *medium*, that will present him in a light which our feeble vision can bear, and under an aspect that we can understand and appreciate.

Such a medium Himself hath provided. In infinite condescension and love, and in a way surpassing all thought and investigation, God in the person of his well-beloved Son took upon him our nature, arrayed himself in a human body, that we might thus, through the mild and softening veil of human flesh, behold the excellency and perfection of the Divine character. In Jesus Christ we see God with his overpowering glories veiled—God manifested in the flesh. "He that hath seen me," he saith, "hath seen the Father also; I and the Father are one." Yes, in Jesus Christ we behold very God under a mild and most amiable aspect, and in a form that we can understand and appreciate, admire and love. So softened and subdued is the character of the Most Highest as seen in Jesus of Nazareth, that the believer of infant years beholds in it features which he loves and aspires to resemble; and so perfect and attractive is it, that all the saints on earth and all the angels in heaven have their eyes fixed on it in holy and delighted contemplation: "Worthy the Lamb," is their united song, "to receive power, and riches, and wisdom, and strength, and honor, and glory, and blessing, for ever and ever."

In Jesus Christ mankind see the character of God revealed as no verbal description could portray, as no

images in the universe could represent, and as no seraph in heaven could set forth. In him the world is blessed with a living, actual, adequate impersonation of the Supreme God. The Divine signature, IMMANUEL, *God with us*, is legible on every part of his conduct and every feature of his character; nor shall saint or angel ever know aught of the invisible God but as it is brought forth and unveiled in the adorable person of Christ.

In Jesus Christ we see the *omnipotence of God* in exercise, controlling, subjecting, moulding all things to the purposes of his will. In his hands we witness a few little loaves quickly multiply and increase into a sufficiency for thousands. At the sound of his voice the mighty elements of nature in the hour of their wildest uproar at once are hushed, and subside into a great calm. He calls to the deaf, and their ears are unstopped at the charming sound. He commands, and the eyes of the blind open to receive the blessed light of day. He lays his hand on the sick, and the crimson fever fades at his touch. He speaks to the frenzied demoniac, and anon the evil spirit flees, leaving its victim a happy worshipper at his feet. He calls to the sleeping dead, and forthwith they awake to life again. Yea, whatsoever works the Father doeth these doeth the Son also.

In Jesus Christ we behold the *omniscience of God*, discerning what transpires in places hidden or remote, speaking of the future as if it were present, and reading at pleasure the secrets of every heart.

In Jesus Christ we see the *heart of God* toward the children of men—its compassion, its tenderness, its mercy, its sweetness and its love. In him we see God in an attitude of amazing pity seeking to win back his erring creatures to himself—God employing and adopting means inexpressibly wonderful and gracious to rescue and to save

them, not willing that any should perish, but that all should come to repentance and live.

In Jesus Christ we behold the *patience, forbearance and forgivingness of God.* Though often vexed by friends and always persecuted by foes—though resisted in his purposes of mercy, and basely requited for his deeds of love—though his actions were decried, his motives suspected, his character maligned, and his spirit misconstrued—though ingratitude, injustice and hatred often pierced his sacred soul—though deserted, betrayed, falsely accused, unjustly condemned, and at last cruelly nailed to a cross—yet his forgivingness, patience, meekness, and measureless love never once forsook him, never once were disturbed; through all his trials, through all his sufferings, he remained absolutely unmoved in the deep pity and love of his heart, and in all his gracious purposes concerning man and man's salvation. "Father, forgive them," was the prayer with which he died, and the spirit in which this prayer was breathed was the spirit which pervaded his whole life.

Thus through *the wonderful medium of the Incarnation* we can see God, and not be dazzled or consumed—see him, not as enthroned above the heavens, but come down within reach of our faculties and of our affections—see him, not as in the power and radiance of his glory, but in a meek and lowly form that we can approach, and see, and hear—see him, not as he dwells amid the mysteries and solitudes of eternity, but in a condition and in circumstances that we can understand and appreciate—see him, not as listening to the praises and homage of angels, but receiving the tears of the penitent and the confessions of the guilty and the prayers of the wretched—see him, not as issuing his high behests or showering down his benedictions upon the happy populations of a thousand worlds,

but in infinite pity and love, laboring, suffering, dying, to save rebellious man! When viewed thus through the softening veil of Christ's humanity, O in what a mild and amiable and attractive aspect does the Divine character appear!—the character of a *Father*—a Father merciful and gracious and ready to forgive—a Father worthy the eternal confidence, admiration and love of all his earthly children!

## ANALOGY V.

*As the Sun arises on a scene enshrouded in nature's darkness—so the Sun of Righteousness arose upon a world involved in moral darkness.*

### Phenomena.

Day and Night have equally divided the empire of the world from the beginning of time. This perpetual interchange of light and darkness, as all know, results from the rotation of the earth upon its axis, thus turning every part of its circumference towards the Sun and every part from it, in the course of each revolution. In this daily rotation of our planet we have a striking instance of the perfection of the Creator's works; the period occupied in its accomplishment is absolutely undeviating, being 23 h. 56 m. 4.09 sec. Our most distinguished astronomers—Laplace, Arago, Mädler and Herschel—have demonstrated that the sidereal day, or the time of the earth's diurnal rotation, has not varied the one-hundredth part of a second in the lapse of the last 3,000 years. If during that period it had slackened or lost but the hundredth part of a second in each revolution, the Day, instead of 24 hours, would now be 27 hours long; or if it had gained that minute fraction in each revolution, the Day would now be reduced from 24

hours to 21 hours in length. But no such change one way or the other has taken place, consequently no such error as the hundredth part of a second has occurred. The Day is now exactly what it was when Moses went out of Egypt, or Abraham out of Mesopotamia. How marvellous is such a fact! Man, with all his science and ingenuity, has never succeeded in producing a clock or chronometer that would keep exact time for one year; nor, indeed, has he been able to set in motion a wheel that would perform one revolution with perfect uniformity. But the unseen hand of the Almighty has turned the vast globe of the Earth on its axis through successive hundreds and thousands of years without the deviation of the minutest fraction of time! How wonderful in counsel, how excellent in working!

Equally admirable is the *adaptation* of this alternation of light and darkness to the constitution of all organic existences—plants as well as animals. Both require seasons of rest to alternate with periods of activity, and the well-being of both depends upon the continuance of this arrangement. The cycle of light and darkness coincides with the cycles of the animal and vegetable constitution. The light quickens to activity, the darkness invites to repose; and the one no less than the other is universally felt and obeyed.

This order of Nature cannot be reversed or disregarded with convenience or impunity. If we seek to sleep in the daytime, the noise and activity about us will disturb our slumbers and render our rest unsatisfactory; and if we undertake to carry on the labors of the day through the hours of the night, it will be attended with various disadvantages, and in many things with pain or peril. When night draws its sable mantle over the face of nature, it is for the welfare of the laborer to cease his

toil, and of the wayfaring man to turn aside and rest till the morrow; for night is a period of gloom, incertitude and danger.

If we adventure to pursue our journey through a strange or foreign country in the night season, it must be not only without interest or pleasure, but at many risks and much inconvenience. Every scene and every object will be involved in dull obscurity; every turn will be suggestive of danger or serve to awaken apprehension. We may be passing through the midst of the most charming scenery, or close by the most sublime prospect; but we might as well pass through the monotony of a sandy desert. for we can discern none of their beauties. Our pathway may be lined with flowers and fountains and statues, or may be beset with pits and precipices; but strain our eyes as we may, we can perceive neither the one nor the other. Things that are near wear unreal shapes, and those at a distance are shrouded in greater vagueness still. What, away before us, appear faintly as the walls and turrets of a city, presently turn out to be nothing more than the irregular shades and outlines of a neighboring hill. These objects here, on our right, which seem so like a file of soldiers pressing on their march to intercept our way, on being neared, prove to be nothing more alarming than the nodding tops of a row of trees. Our attention having been altogether engrossed with illusions such as these, we presently discover that we have unconsciously turned aside from the right course and lost our way, and are actually standing on the verge of a soft and trembling quagmire. Beating a hasty retreat from this dismal situation, we make for the higher ground; but in doing so we are soon brought to a sudden stand: directly before us lies the crouching form of a huge beast—his eyes glare—he is ready to spring! We look—we listen—we look

again; another breathless moment passes—and lo, the frightful figure before us, beneath a gentle flash of lightning, fades away into a harmless log! Weary and bewildered, we at length resolve to sit down and wait for the day.

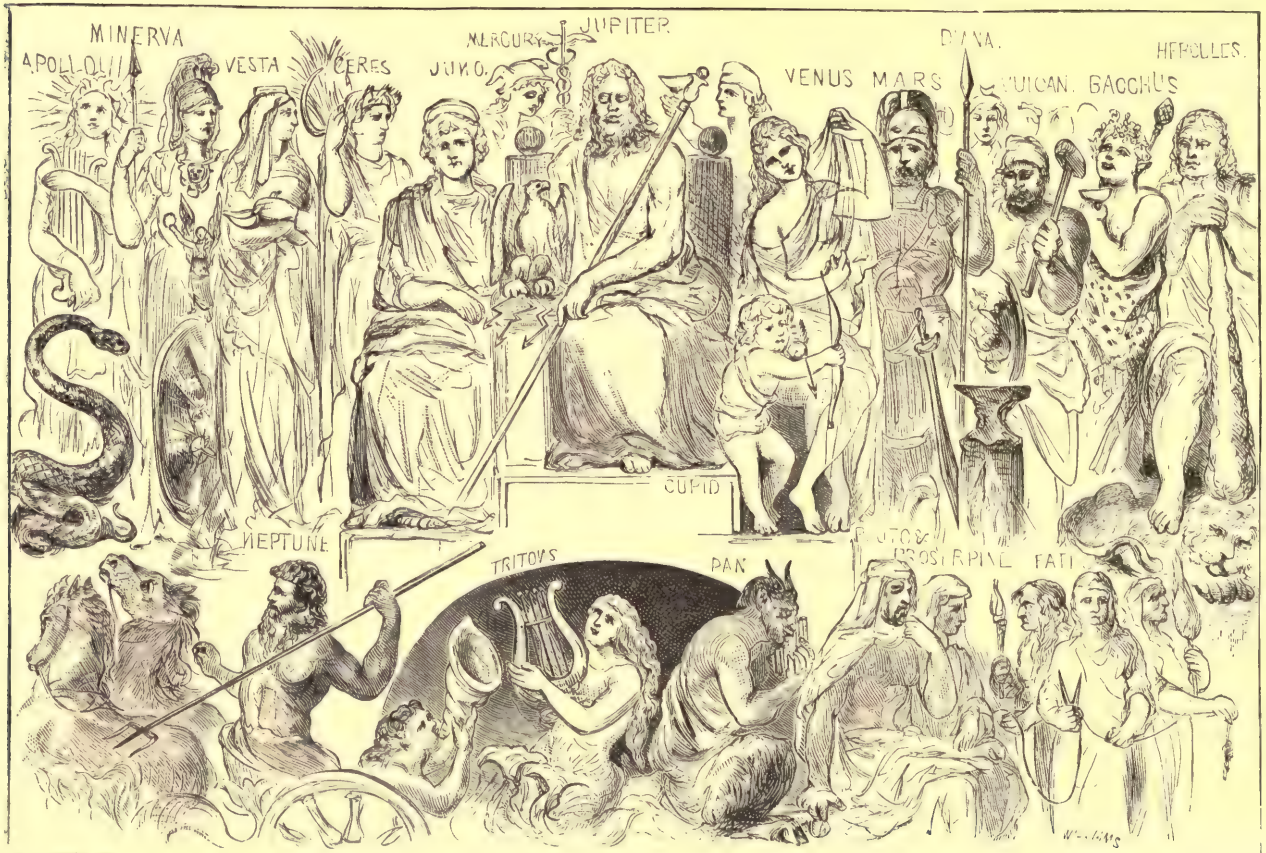
It is a mild, serene, midsummer night. The third watch is far advanced. Darkness broods over all around. The winds are whist, and not a sound is to be heard. The sky is clear, bearing scarce a cloudlet. The stars are twinkling in every quarter. Jupiter's placid orb is sinking toward the west; while the Pleiades, just above the horizon, are shedding their sweet influences in the East. Lyra sparkles near the zenith; Andromeda, as through a veil, is revealing her modest glories in the South; and the steady Pointers, from the depths of the North, are looking meekly upward to their lord, the guiding Star of the Pole. Beneath this glorious spectacle, these spangled heavens, but all involved in darkness, we sit and wait for the light of coming day. Ere long the faint approach of twilight becomes perceptible; the darkness of the sky begins to soften. Soon the smaller stars one by one fade out of view; others gently follow; and presently all the bright orbs of the East melt away; but the constellations of the West, a while, remain unchanged. Wondrous is the transfiguration that is in process! Hands unseen seem to be shifting the scenery of the heavens. The magnificence of night is fast dissolving into the glories of the dawn; the blue of the sky is now turning into the softer gray. The East begins to kindle —faint streaks of purple blush along the sky—other and deeper blushes follow. Now the whole celestial concave is filling with the morning light, which comes pouring in as one great ocean of radiance. Again flash after flash of purple fire blazes out, shooting far and high above the horizon,

and turning the dewy drops on flower and leaf into rubies and diamonds. A few more seconds, and the everlasting gates of the morning are thrown wide open, and the Sun, the lord of day, arrayed in glories too severe for the gaze of man, begins his course. Light! glorious light now is come, and the shadows of night are fled away. Now every object appears in its real form, and every scene stands forth arrayed in its true colors. The hills and the valleys unroll their enchanting panorama of field and grove and silvery streams. Every living creature is in motion, and rejoicing as if infused with new life. Music fills the air. The mountains and the hills seem to break forth into singing, and all the trees of the field to clap their hands for joy.

## Teachings.

Such is the night-season, and the situation of man amid its gloom, uncertainties and dangers; and such the marvellous and enchanting transfiguration which passes over the face of a country enshrouded in darkness when the Sun in his brightness arises upon it. No scene on earth, no spectacle visible to man in the material universe, equals in grandeur and glory the rising of the Sun. Yet this, all this, is but an emblem of a far more wonderful and glorious event in the spiritual universe—*the rising of the Sun of Righteousness upon the world of mankind lying in iniquity and moral darkness.*

That *this* would be the moral and religious condition of mankind, or rather their immoral and idolatrous condition, at the time of Messiah's advent, had been clearly foretold by the prophet full 700 years before, in this expressive and striking announcement: "Behold darkness shall cover the earth, and gross darkness the people." No words could have more correctly described the actual state




S. J. Ferris, del.

GODS MANY AND LORDS MANY.

of the world when the Son of God appeared among men than these employed by Isaiah. Darkness, *gross darkness*, alone could have supplied an adequate figure to set forth the condition to which the race, Jews as well as Gentiles, had sunk at that period. A vast, dark and impenetrable cloud, composed of ignorance, superstition and idolatrous debasement, had overspread and settled down upon the face of the whole earth, which well-nigh excluded every ray from heaven. The most advanced and highly favored of the nations groped, as the blind for the wall, after the first principles of truth—after the true object of worship, the origin of the world, the powers that ruled over it, and the final destiny of the race inhabiting it. Even those few individuals that appeared among them, who were endowed with a superior degree of intellectual power, their sages and philosophers, and who occasionally obtained a glimpse of the true path, were yet unable to proceed in it, but again lost themselves in the mazes of error and uncertainty, and disgraced what little they had acquired of sound wisdom by an admixture of the most extravagant and absurd opinions.

All certain and correct knowledge of the true and living God—of his nature, character and proper worship—had vanished from among men; and in his stead, their corrupt imaginations had created "gods many, and lords many," even past all enumeration. "Why add more gods?" exclaims Cicero: "what a multitude of them we have already!" We are informed by Hesiod, Varro, and other ancient authors, that no less than 30,000 subordinate divinities were comprised within that system of idolatry which prevailed among the Greeks and Romans. They had both celestial and terrestrial deities. They assigned peculiar gods to the fountains, the rivers, the

hills, the mountains, the lawns, the groves, the sea, and even to hell itself. To cities, fields, houses, families, gates, nuptial chambers, marriages, births, deaths, sepulchres, trees and gardens, they also appropriated distinct and peculiar deities. At Athens, the centre of Greek civilization and literature, "it was easier," Petronius tells us, "to find a god than a man;" the city was full of the images, temples and altars of their fictitious divinities. And Rome, as it became the capital of the world, became also the pantheon of the world, and the asylum of deposed and fugitive gods from all nations.

The *character* also of the heathen gods at this period was monstrous, demoralizing, debasing and disgusting to the last degree. Their highest divinities were distinguished for nothing so much as for their vices—their cruelty, treachery, murder, lust, and debauchery of every kind. They even set up beasts, birds, and reptiles as objects of worship. "If you go into Egypt," says Lucian, "you will see Jupiter with the face of a ram, Mercury as a fine dog, Pan as a goat; another god is Ibis, another the Crocodile, and another the Ape. There the shaven priests gravely tell us, that the gods, being afraid of the rebellion of the giants, assumed these shapes."

To such gods of superhuman vices, and to such contemptible divinities, splendid temples were erected, adorations paid, costly offerings presented, and rites and ceremonies performed which were subversive of every principle of morality, and degrading to the reason and character of man. The natural effect of such devotion was to lead the worshipper to imitate the example of the gods he adored, and to transform him into the same spirit. Accordingly we find that the state of society, even among the Greeks and Romans, was depraved to the lowest degree. The lives of men of every class, from the highest

to the lowest, were consumed in the practice of the most abominable and flagitious vices; even crimes, the horrible turpitude of which was such that it would be defiling the ear of decency but to name them, were openly perpetrated with the greatest impunity. In the writings of Lucian, Juvenal and Persius, we find the most detestable and unnatural affections, and other heinous practices, treated of at large, and with the utmost familiarity, as things of ordinary and daily occurrence. And if such were the people distinguished beyond all others by the excellence of their laws and the superiority of their attainments in literature and the arts, what must have been the state of those nations who possessed none of these advantages, but were governed entirely by the impulses and dictates of rude and uncultivated nature? Verily "darkness," as the prophet had foretold, "covered the earth, and gross darkness the people."

Leaving now the heathen world, we turn to glance at the condition and character of the *Jewish nation* at this period. From this people, by reason of the Revelation given them, much might be expected; but we find that they too had sunk into spiritual blindness, and erred exceedingly from the truth. Their very teachers had come to misrepresent in a shocking manner the character, the attributes, the doings, and the nature of the True and Living God. "In the prevailing conceptions of the people, his justice was little else than revenge; his love, partiality; his providence, arbitrary interpositions; his revelation, a cabalistic secret; and his infinite nature, a huge extension of the caprices and passions of men." His worship, as a consequence, had degenerated among them into dead formalities and bare hypocrisy. There were, indeed, a magnificent temple, an ordained priesthood, a vast and gorgeous ritual; but spiritual worship, the vene-

ration and love of a God of holiness, purity and truth was almost unknown. Gross wickedness was frequently hidden beneath the forms and the name of religion. "The great mass of the Jewish people, at the time of Christ's birth," says Mosheim, "were sunk in the most profound ignorance as to divine matters; and the nation, for the most part, devoted to a flagitious and dissolute course of life." The same authority makes this further statement,—"It is unquestionable that the religion of the Pharisees was, for the most part, founded in consummate hypocrisy; and that at the bottom they were generally the slaves of every vicious appetite; proud, arrogant and avaricious; consulting only the gratification of their lusts, even at the moment of their professing themselves to be engaged in the service of their Maker."

Such, in short, were Jews and Gentiles at the period of the Saviour's advent—such the ignorance, idolatry and degradation that universally prevailed—such the hopeless and forlorn condition into which the whole race had sunk. As the darkness of night advances and envelops the earth, the fair face of Nature fades from the sight, every object and every scene becomes indistinct, and presently wholly obscured, and all that can cheer the eye or direct the steps vanish; so the growth of innate depravities, and the accumulation of religious errors, augmenting and darkening from age to age, at length banished the knowledge of God and his truth from the understanding of men, and the love of justice, purity and benevolence from their hearts, till all that was ennobling to the soul, cheering to the heart, supporting to the hopes, or directive to the action, passed away from the minds of mankind, and left them, like the face of Nature at night, enveloped in gloom and obscurity. Deep spiritual darkness, like the pall of death, settled down upon the whole earth.

It was at this period of supreme degeneracy and hopelessness that Eternal Mercy cast an eye of pity upon the abode of man. As the Sun of Nature, heralded by "the bright and morning star," arises upon a region wrapped in obscurity and gloom, so the Sun of Righteousness, heralded by that "bright and shining light," the Baptist, arose upon the world of mankind, shrouded and buried in the darkness and degradation of this prolonged night. Like the Sun, a Divine and Glorious Orb, he illumined the world with his truth, and revealed all things therein in their true and real character. His bright and benignant beams, wherever they fell, dispersed the dank mists of ignorance, chased away the illusions of superstition, and banished the phantom gods with which idolatry had infested sea and land and air. Pouring a flood of light from above upon benighted humanity, he opened up to them views of the One Living and True God, of themselves, of duty, of happiness and immortality, such as the world had never heard or known before. "The people that had so long sat in darkness saw great light; and even to them who had lain in the region and shadow of death light now sprang up." Their night was turned to day; and their intellectual and moral field of view was become bright and inspiring as the landscape in its morning dews. "Old things had passed away; behold all things were become new;" *existence* appeared in a new light, *life* was invested with new interest, and *eternity* inspired new hopes.

## ANALOGY VI.

*As the Sun arises upon the world with a flood of health in his warm and lightening beams,—so the Sun of Righteousness arose upon mankind, "with healing in his wings."*

### PHENOMENA.

THE SUNBEAM—this is one of the marvels and high mysteries of creation! Of all the elements or agencies that play an important part in the material universe it is the most remarkable, and the most potential and far-reaching in its influence. Nothing escapes or eludes its power. Plants, animals, and even minerals own its sway. Over all and through all and for all it extends its ethereal forces. Every motion of air or ocean, every enjoyment of man or beast, every charm of color or golden glow, which overspreads the rolling globe, is directly dependent upon its warm and luminous powers. In a word, the Sun's beams daily descend to the earth laden with the elements of life and health to all that breathe, or move, or grow upon its whole surface.

To speak more particularly—The Sun arises with healing in his beams to the ATMOSPHERE of the earth. The atmosphere is composed mainly of oxygen and nitrogen, mixed in nearly the proportion of *one* to *four;* but with this mixture is invariably associated a small proportion of carbonic acid gas. The latter is poisonous to all air-breathing animals; a few inspirations of it, in a pure or concentrated state, are sufficient to extinguish life; but the quantity existing in the air—only about 1-2,000th part of its volume—is so small that it is productive of no harm. There are, however, numerous causes in constant operation that tend to destroy this balance, and produce a noxious excess of carbonic acid. We ourselves unceasingly manufacture this deadly gas. With

every inspiration we necessarily draw into the lungs the minute portion of it naturally mixed with the air; but with every expiration we throw out sixty times the quantity taken in; and the whole amount of carbon thus daily carried off from the lungs of a healthy adult amounts to from nine to twelve ounces. This, at first thought, may appear small and of little consequence; but let these nine or twelve ounces be multiplied by *twelve hundred millions*, the number of the earth's inhabitants, and the product again by the number of days in a year, and the annual amount will be found to be enormous.

The quantity of this gas produced by the respiration of beasts, birds and all the lower animals, has been estimated to amount to more than twice that of the human population of the globe. An amount still more enormous is produced by the decomposition of animal and vegetable matter over the face of the whole earth, and by the combustion of all the oil and coal used for light and fuel—every candle, every lamp, every stove, every forge and furnace, sends forth its stream of this poison into the air. Add to all this the vast volumes that issue from hundreds of volcanoes, from earthquake fissures, from mineral springs, and numerous other sources—and we have a total production of carbonic acid, which, unless by some means checked or counteracted, would evidently at no distant day so charge the atmosphere with its poison as to render it utterly unfit to breathe; so small a proportion of this gas in the air as ten per cent. would be sufficient to bring about universal death.

How then is this fatal result avoided? By what means is the atmosphere preserved in a healthy condition? Mainly through the influence of the *sunbeams*. The Sun rouses the vegetation of the whole globe into daily activ-

ity to take up and dispose of the excess of carbonic acid produced in the ways just named. The leaves of trees, shrubs and plants, together with every blade of grass, bathed in the air as they ever are, under the stimulus of Light, extract from it the chief bulk of the carbon which goes to build up the woody substance of the tree, shrub, or stalk to which they belong. The leaves can perform this function only so long as they are stimulated by the light of the Sun; in the night the process ceases, but in the day-time the leaves and grass-blades, like the lungs of animals, are everywhere and constantly at work upon the atmosphere, seizing upon the particles of carbonic acid in it that come in contact with them; and, while they liberate the oxygen and restore it to the air, they fix the carbon in their own substance. And thus the vast and numerous causes which tend to vitiate the atmosphere, are, through the influence of the Sun upon the vegetation, effectually counteracted, and the balance of the gases and the healthy condition of the air maintained unimpaired. It is therefore literally true that the Sun daily arises with healing in his beams to the atmosphere of the whole world.

Again, the Sun arises with light and health in his beams to the VEGETATION of the world. The influence of Light upon vegetable life has been long and successfully studied by the botanist and the chemist. Their experiments and researches have placed it beyond a doubt, that the rays of the Sun exert the most marked influence on the respiration, the absorption and the exhalation of plants, and consequently on their general health and growth and fruitfulness.

The light and heat of the Sun are essential to everything that springs out of the ground. The plant, of whatever character, through every stage of its existence, de-

rives its health and energies directly from the Sun. It is by his genial warmth that its germ in the buried seed is first quickened into activity. And when its leaflets shoot forth into the air, it is from the Sun's rays that these derive their power to absorb water, carbonic acid and ammonia, and to construct these materials into the woody substances of which the plant consists. And it is still through the influence of the Sun that its growth is carried on to maturity, and finally its flowers to gems of beauty, and its fruit to ripeness and perfection.

Deprived of the light of the Sun no tree, or plant, or blade of grass will thrive, and attain its natural perfection. It is true, indeed, that the vegetative process will go on in some sort, and to a limited extent, even in absolute darkness; but it will be a sickly process; light is indispensable to the vigor and to the useful and ornamental properties of plants. When deprived of light, all plants nearly agree in the qualities of their juices; the most pungent then become insipid, the most fragrant inodorous, and the most variegated of a uniform whiteness. To the agency of light, therefore, vegetation owes its taste, its smell, its color, and all its important properties. So necessary is light to the health of plants, that many of them will spontaneously throw open wide their flowers, and even exert a limited power of locomotion, bending towards it, in order to catch its vivifying influences.

Vegetation, in all its forms, and throughout the world, proclaims its dependence on the great orb of day, and owns that every function of its life is due to his mysterious influences. Every tree that spreads its green leaves to the breeze, every fruit that blushes in the sunshine, and every flower that lends its beauty to the earth—the cedar that waves its extended branches on the heights of Lebanon, and the pure white lily that floats on the bosom

of the lake—the climbing lianas of the forest, and the delicate rose of the garden—the contorted cactus of the burning plains, and the reindeer lichen of the arctic hills—the greatest and the humblest of the vegetable creations—all, without a dissentient voice, ascribe their life, their health, their beauty to those ethereal forces which daily visit them in the *sunbeam*. Travel we round the earth, and one sweet note, echoed from plant to plant and breathed from flower to flower, attends our footsteps through every clime—*All to the Sun we owe.*

The Sun also arises with health in his beams to all the Living Tenants of the world. This is obvious from what has already been stated; for, in preserving the purity of the air for their respiration, and promoting the growth of vegetation for their sustenance, he most effectually promotes their health and their welfare in all respects. But in addition to this, the Sun's warm and luminous beams exert directly a salutary influence upon all animated nature. His light and heat are the essential stimulants of vital force. All living creatures experience these, and attest the benefits they derive from them. The young beasts are animated into gambols beneath his quickening rays; the birds attune their music to his praises; the insects in myriads and millions are on the wing to welcome his return; and every thing that breathes, or moves, rejoices at his appearance. As he diffuses light, so he diffuses life and health throughout creation; and without him all nature would droop and languish and die.

And the beams of the rising Sun—how charged with health and spirits to Man himself. What serenity they diffuse over his soul—with what activity they inspire his whole mind and body. "Delicate and mysterious, indeed," says Professor Johnston, "is the relation which

our bodies bear to the passing light. How our feelings, and even our appearance, change with every change of the sky! When the Sun shines, the blood flows freely, and the spirits are light and buoyant. When gloom overspreads the heavens, dulness and sober thoughts possess the mind. The energy is greater, the body is actually stronger, in the bright light of day; while the health is manifestly promoted, digestion hastened, and the color made to play on the cheek, when the rays of sunshine are allowed freely to sport around us."* On the other hand, "deprivation of the light of the Sun is rapidly followed by disease of the animal frame, and the destruction of the mental faculties. We have proof of this in the squalor of those whose necessities compel them to labor in places to which the blessings of sunshine never penetrate, as in our coal mines, where men having everything necessary for health, except light, exhibit a singularly unhealthy appearance. The state of fatuity and wretchedness to which those individuals have been reduced, who have been subjected to years of incarceration in dark dungeons, may be referred to the same deprivation."†

Long and careful observation in the great cities of Europe has established the conclusion, that the free and constant influences of light are found very favorable to the regular conformation of the human body, and to the vigorous development of the mental faculties. Deformity and idiocy are most frequently found, and frightful diseases commit their most terrible ravages, in the ill-lighted habitations of narrow streets and northern exposure, where the salutary beams of light seldom, or in but scanty measures, shed their beneficial influence.

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* *Chemistry of Common Life*, vol. ii., p. 330.

† *Hunt's Poetry of Science*, p. 302.

The due and daily influence of sunlight also contributes much to the recovery of the sick. A well-lighted apartment, and one commanding a southern view, is the most desirable and promising to the feeble invalid. Reliable statistics prove that, in general, the chances of recovery in the well-lighted wards of hospitals are four to one, as compared to the chances in ill-lighted or dark wards. "Light," says Dr. Chapin Child, "is one of the best and cheapest of Nature's tonics; and unless it be habitually absorbed, neither animal nor vegetable can permanently prosper. Hence this needful medicament, by Divine arrangement, is poured out in daily streams upon the face of the whole earth."*

So true is it, and so manifest, that the Sun daily rises with *a flood of health* in his silvery beams to the Atmosphere, to the Vegetation, and to the Living Tenants of the whole world:

## Teachings.

In all this we have a beautiful and instructive analogy to *the Sun of Righteousness arising with healing in his wings upon the world of mankind.*

When Jesus, in the fulness of age, came forth from Nazareth to assume publicly the duties of his Divinely appointed office as a Teacher sent from God, it was as the coming out of the Sun from the chambers of the East to illumine the earth; and, like that orb, while pouring a flood of light on all around him, he remained himself a wonder and a mystery to all who witnessed his deeds or listened to his words. "They were astonished beyond measure," and retired from his presence exclaiming, "Whence has this man such wisdom!"

As the Sun of Nature arises to purify the air we

* *Benedicite*, p. 96.

breathe, so the Sun of Righteousness arose to purge the MORAL ATMOSPHERE of the world. The moral atmosphere of Judea, and of the whole earth, at that day, as we have seen in the preceding chapter, had become vitiated to a deplorable degree. Corruption of morals and principles, like poisonous gases, had been augmenting and thickening in it from age to age. Every depraved heart of man, like the smoking lamp—idol temples, like stifling furnaces—and cruel wars, like the desolating and sulphurous streams of volcanoes—had long been sending forth their demoralizing and debasing influences, with scarce an intermission. All had become corrupt and corrupting. Divine worship had ceased to be understood, and human virtues had ceased to be practised. Devotion and love toward God, and rectitude and benevolence toward man, had become empty names. Power had usurped the seat of justice, and vice had assumed the garb of virtue. Friendship had degenerated into a tissue of hypocrisy. And a spirit of selfishness had dried up the springs of all genuine goodness.

Such was the infected and deadly atmosphere in which mankind lived and moved and had their being when the Sun of Righteousness arose upon the world. To restore that atmosphere to salubrity, he poured down upon it, as in radiant beams, the lessons of Divine truth and wisdom and love. And to rouse men from their deep and deepening stupor in it, he announced to them the Being and the Presence of the one living and true God—acquainted them with the nature of his acceptable worship—proclaimed the purity and solemn sanctions of the Divine Law—made known the immortality of the soul, and its strict judgment at the last day—revealed the glories and felicities of heaven, and uncovered the dread enormous woes of hell—exhibited virtue in its native loveliness,

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and vice in its odious deformity—showed the greatness of a meek and humble spirit as compared with that of pride and haughtiness, the superiority of a forgiving mind over that under the dominion of malice and revenge, the dignity of love and beneficence in contrast with ill-will and selfishness. And all this he exemplified and enforced by his own spotless and winning example, his whole life being a beautiful picture of human nature in its sinless purity, simplicity and loveliness. He stood before men the embodiment of all essential goodness; and, as he moved to and fro, as he labored or rested, healing virtue went out of him to the benefit of dying humanity.

Nor was this all. As the Sun of Nature stimulates the vegetation of the whole globe into activity to check the increase of the poisonous carbonic acid in the air, not a plant, not a leaf remaining inactive,—so the Sun of Righteousness inspired, and still inspires, his every follower, as so many trees and plants of righteousness, to holy activity in counteracting and abating the corruption of the moral atmosphere of the world, not a soul being exempted or excused from bearing his part in the work. And as the plant in eliminating the carbonic acid from the air acquires its appropriate food—carbon, and promotes its own growth thereby; so likewise the followers of Christ, by their very labors to abate the evils that are in the world and to promote its welfare, add to their own strength and further their own spiritual welfare; the effort to save others is transmuted into an element of life to themselves. Such are the beautiful economies of Nature and of Grace—in both, not a ray of light is bestowed in vain; in both, not an individual is to remain inactive; in both, not a duty is performed but it brings its recompense or reward.

These elements of healing, these forces for the purifica-

tion of the moral atmosphere, brought in and ordained by Jesus Christ, have never ceased to be operative and effectual for that end. There is not, and there never has been, a country or region of the world, in which his Gospel has been received, where its power has not been made manifest in the most astonishing changes produced in the moral habits of society, and in the moral atmosphere which they breathe.

The Sun of Righteousness arose with healing in his wings also for the BODILY MALADIES of men. "He was touched with the feeling of our infirmity." His heart was moved with compassion, and his compassion moved his almighty power for their relief. "Wherever he came," says the devout and eloquent Dr. Harris, "disease and suffering fled from his presence. His path might be traced from place to place in lines of life, and health, and joy. Where he was expected, the public way was thronged with forms of helplessness, disease, and woe. Where he had passed, the restored might be seen making trial of their new-found powers; listeners formed into groups, to hear the tale of healing; and the delighted objects of his compassion rehearsing with earnestness what had passed, imitating perhaps his tones, and even trying to convey an idea of his condescending ways. His voice was the first sound which many of them heard; his name the first word they had pronounced; his blessed form the first sight they had ever beheld. And often, at the close of a laborious day, when his wearied frame required repose, the children of affliction besieged his retreat, and implored his help. Nor did they implore in vain; wearied and worn as he was, he pleased not himself; he went forth, and patiently listened to all their tales of woe, tasted their several complaints, raised each suppliant from the dust, nor left them till he had absorbed

their sufferings, and healed them all. He went through the land like a current of vital air, an element of life, diffusing health and joy wherever he appeared." This is his record—"And Jesus went about all Galilee, teaching in their synagogues, and preaching the gospel of the kingdom, and healing all manner of sickness, and all manner of disease among the people. And his fame went throughout all Syria: and they brought unto him all sick people that were taken with divers diseases and torments, and those which were possessed with devils, and those which were lunatic, and those that had the palsy, and he healed them." Jesus of Nazareth! how true of thee the words spoken by the holy prophet, *he shall arise with healing in his wings.*

Again—The Sun of Righteousness arose with healing in his wings for the SIN-SICK SOULS of men. The Race for whose deliverance he came into the world was diseased in soul as well as in body. Sin, like a fatal malady, had affected their whole being. Indeed, the source of their chief misery and danger lay in the disorders of the soul; these were incurable by any earthly remedy, and always tending to a fatal issue. Bodily diseases are but as types of the more terrible diseases of the mind. What is *lust*, but a corroding Leprosy in the system? What is *jealousy*, but a Cancer gnawing within the soul? What is *discontentment*, but Dyspepsia, unsuited with food of whatever kind? What is *envy*, but a Jaundiced eye, seeing the things of others in a coloring of its own? What is *selfishness*, but an Ague, cold and cheerless even in the sunshine? What is *pride*, but Lunacy feeding on imaginary worth or greatness? What is *anger*, but a Fever, hot and hurried? What is *avarice*, but a Dropsy still accumulating more and more? In short, there are as many diseases of the soul as there

are of the body; and there is not, perhaps, a spiritual malady but has its *analogue* among those that are corporeal.

Add to all this the fact that sin affects the soul as disease affects the body. In bodily disease, some part or parts of the system do not properly and freely perform their office; there is always some weakness, some obstruction or derangement: it is the same with the maladies of sin; the powers and functions of the soul are injured and interrupted—the understanding is darkened, the conscience is deadened, the affections are debased, the taste is vitiated, the will is perverted. As disease of the body soon deprives it of its beauty, of its appetite and freedom and strength; so sin deprives the soul of its moral beauty, of its appetite for spiritual food, of its freedom to do the will of God, and of its strength to serve and honor him. And, as disease of the body, unless arrested and cured, tends to its final dissolution; so sin in the soul, unless subdued and extinguished, will inevitably issue in its eternal ruin.

Such is the infection of sin, and such were the maladies under which our hapless Race labored and suffered when Jesus appeared among men. All were sick, all were alike affected; there were none whole or well, no, not one. The world was as one vast hospital, with its every ward full of corruption and guilt and misery. All were sinking together under the power and progress of their sad maladies, when the Sun of Righteousness arose with healing in his wings upon them all. And, oh what health, what cheer, what hope did his blessed beams bring to dying men!

*He arose in the healing power of a Love* that took upon himself our griefs, and carried our sorrows—that submitted to be wounded for our transgressions and bruised for

our iniquities—that led him to pour out his soul an offering unto God on our behalf, and by his death to make a full and sufficient atonement for the sin of the world! No balm could ever have been poured into human wounds so healing as this Love of God in Christ; and no cordial administered so reviving to the fainting spirits of men, as this sweet message brought down to earth on his benignant beams, "God so loved the world that he gave his only begotten Son, that whosoever believeth in him should not perish but have everlasting life."

*He arose in the healing power of Divine Truth*—truth which revealed to men at once their disease and their remedy, their lost estate and their only means of salvation—truth which was able to make them wise unto life eternal, by opening their eyes to see the Fountain opened for sin and uncleanness, where the dying might wash and be made whole.

*He arose in the healing power of the Spirit of Grace.* The inestimable gift of the Holy Spirit he obtained and bestowed upon men, enlightening their minds, subduing the powers of sin, implanting new and holy dispositions, begetting hunger and thirst after righteousness, elevating their affections, sanctifying all the powers of the soul, and making the entire man *a new creature.*

Yes, the Sun of Righteousness arose with abundant and effectual healing in his wings for all the ills and maladies of sin. Let the spiritual invalid, whatever be his case, hasten to his light; let him cast his soul beneath his beams, and in the words of the son of Jesse cry, "Heal my soul, for I have sinned," and health shall flow again through all the parts and powers of his being.

Once more—The Sun of Righteousness arose with healing in his wings for the SOCIAL EVILS under which mankind suffered. Sin had introduced manifold disorders and

evils into the social institutions, as well as into the souls and bodies of men, which wrought misery and destruction to unnumbered millions. But the just and humane precepts, the spirit of benevolence and brotherly love, enjoined by Jesus Christ, proved a "mollifying ointment for these wounds, and bruises, and putrefying sores" of humanity. His Gospel, wherever received, has wrought the most benignant changes in all the relations of life. It has brought another atmosphere into the Family—abolishing polygamy and capricious divorces, softening parental authority, and raising woman from miserable subjection and drudgery to a condition of respect, influence, and happiness in society. It has given another spirit to the State—it has abolished cruel laws, mitigated the horrors of war, restrained violence and oppression, infused a spirit of justice and humanity into governments and society, advocated the rights of the poor and suffering, removed the fetters of the slave, and stimulated moral reform and progress in every direction.

The advent of Christ was the beginning of a new era in the spirit of communities and in the policy of States. When he appeared among men, neither the Jews nor the Gentiles had any certain provision, or any public places for the accommodation of the sick, the poor, the widow or the orphan; nor was there a single hospital in the whole heathen world. But behold what his gospel hath wrought! Every Christian country abounds with charitable institutions for all these classes. The flow of beneficence, proceeding from this Divine source, among Christian nations, and especially in our own happy land, has left no means untried for ameliorating the condition of the sick and the poor;—it has provided homes for the aged and the orphan; it has erected hospitals and dispensaries for the unfortunate and impoverished; it has fur-

nished asylums for every grade and class of suffering humanity; it has extended its efforts to the abodes of guilt and crime, and has undertaken to put within the reach even of the prisoner, all the comforts that are compatible with the claims of justice.

Christianity has taken the lead, and been the chief author and promoter of all that is good and praiseworthy and enduring in our modern civilization; and whatever hopes we may entertain for the future progress and amelioration of the race, they must still depend on HIM from whose healing beams come down all life, all health, all good to man

## ANALOGY VII.

*As the Sun arises for the good of the whole globe of nature—so the Sun of Righteousness arose to benefit and to bless the whole world of mankind.*

### PHENOMENA.

FEW subjects, if any, are more worthy of study, as few repay the labor of study with richer rewards, than the grand harmonies which subsist between the system of Nature and the kingdom of Grace. To the contemplative mind this is a field of sublime interest. Man is ever delighted with the discovery of useful or important truth, and the discoveries made *here* concerning the wisdom, the munificence, the grace, of the Great Supreme, often flash upon the mind as the smile of sunlight upon the captive in his dark prison. The scenes and changes, witnessed in the world around, when considered in this aspect, not unfrequently open up trains of thought that come in upon the soul with all the freshness of *a new revelation.* To discern in the general and impartial ordinances of Na-

ture a pleasing evidence of the universal and impartial love of God for all his earthly children, never fails to calm and refresh the soul; and to see in the invariable operation and steady march of physical laws, throughout the world, a clear reflection of the unfaltering hand of Omnipotence, conducting to their destiny all the dwellers upon earth, ever reassures and strengthens our faith. Such is the nature of the subject to which the present analogy invites our contemplation.

God governs the material world according to general laws; and the administration of these laws is the same in all parts, and for all its living inhabitants. He guides its forces, combines and moulds its substances, and brings about its recurring changes, according to the same laws, in all climes, and through all time. The whole globe is subject to the same grand rotations, to the same round of seasons, the same interchange of day and night. The same atmosphere envelops the whole earth, the same ocean-waters overspread it on every side, and the same Sun warms and illumines it from pole to pole. And these great elements of Nature move and operate respectively according to the same uniform laws the world over; they have never been known to act differently in one region from what they do in another. Whether we traverse the plains, or climb the mountains, or sail upon the seas, we find these laws in undeviating operation. Gravitation exerts its power according to the same rule; tides rise and fall after the same periodicity; gases combine in the same proportions; light is reflected and refracted at the same angles; heat is radiated and the air is condensed or rarefied after the same rules; and dew and rain and snow are produced under the same circumstances and according to the same process—whether we stand on this or that side of the globe. The ordinances of Nature are the same to all.

In the present chapter, however, we are concerned more especially with the equal and uniform rule of the great "lord of day." *The Sun shines equally on all parts of the earth's surface.* His beams leave no region, no isle, no spot unvisited. "His going forth is from the end of the heaven, and his circuit unto the ends of it; and there is nothing hid from the heat thereof." He illumines equally the sea and the land, the glowing tropics and the icy poles. All countries upon the face of the earth, in respect to time, equally enjoy the light of the Sun, and are equally deprived of the benefit of it; that is, every inhabitant of the globe has the Sun above his horizon for six months in the year, and below his horizon for the same length of time within that period.*

*The Sun shines with the same light on all parts of the earth.* His light is essentially the same in nature and properties in every part of the world. Wherever it falls, the sunbeam carries in its silvery thread the same luminous, and heating, and chemical powers; analyzed, it exhibits the same colors, and in the same order; polarized, it displays the same phenomena; falling upon polished surfaces, it is reflected at the same angle; passing into or out of denser or rarer mediums, it is refracted in the same degrees,—whether this is done in the torrid, the temperate or the frigid zones. None of its benefits or influences are withheld from any region.

*The Sun shines for the same ends or purposes upon all parts of the world.* Everywhere he bestows all the varied benefits of his light and heat. In pursuing his daily course around the globe, he purifies its atmosphere, stim-

* This, though very nearly true, is not accurately so. The sun is about seven days longer in passing through the northern than through the southern signs; that is, from the vernal equinox, the 21st of March, to the autumnal equinox, 23d of September, being the summer half-year to the inhabitants of north latitude, is 186 days; the winter half-year is therefore only 179 days.—See *Keith on the Globes*, p. 43.

ulates its plants and animates its living tenants over all its broad circumference. In all regions he overspreads the scenery with the charms of shades and colors, and illumines every creature endowed with the power of vision to pursue the appointed means and ends of its existence. In brief, upon every order and every individual, among both plants and animals, he pours the full measure of all his influences, according to their respective wants and natures.

Thus the solar orb is one and the same to the whole world. If any portions of the earth receive his light and heat in lesser degrees than others, this difference is owing, not to anything in the Sun, but to the fact that those portions avert their surfaces from him, and thus receive his rays more or less obliquely. The Sun himself is the same to all.

The Sun is the common and equal benefactor of all that live or grow upon the face of the globe. What he is to one, he is to all. While he warms and stimulates a particular plant, he never withholds the same benefits from those that grow around it; nor, while he illumines the eyes of one animal, does he ever leave those standing by its side enveloped in darkness—these, indeed, may close their eyes and exclude his light.

This great luminary is an impartial distributor of his blessings to the whole world's population. None are denied its full benefits—none are neglected—none are overlooked. It shines with equal brightness upon the evil and the good, the just and the unjust. Its beams flow down alike unstinted and unmodified upon the white man and the black, upon the savage and the civilized. In a word, all the nations and kindreds and tribes of the human family are daily bathed in his luminous and cheering rays.

## Teachings.

As the Sun thus arises and shines for the good of the whole globe, and all that live or grow thereon,—*so the Sun of Righteousness arose to benefit and to bless the whole world of mankind.* He came forth from the Father to be the light and the life of the whole human Race—came, that like the shining Orb of Day, He might encircle the whole earth with light from heaven to guide the weary, wandering children of men back to their Father's house.

Like the Laws of Nature, the principles and provisions of Grace through Jesus Christ are general in their character and universal in their application. As with the world of matter, so with the world of mind, one general system of administration is ever pursued by the Great Ruler and Father of all. With Him is no respect of persons.

The Son of God assumed our Nature to become the Saviour of the world. There was nothing in his mission, nothing in his character, nothing in his teaching, nothing in his atoning sufferings, of a local, or limited, or temporary nature.

His mission embraced *the world*, and was designed to secure privileges and blessings in which all the nations of the earth should partake alike. His great and gracious purpose was not confined to Judea, but rose far above all national, educational, or social influences. He stood forth before the world, not as a Jew, but as a *Man*, a Brother and a Representative of the race, to fulfil his high and spiritual mission, which embraced not the Jews only, but universal humanity.

The Messages of mercy and love which He brought from the Father were messages for *the ear of the world.* "Whoso hath ears to hear let him hear: God so loved

the world that he gave his only begotten Son, that whosoever believeth in him should not perish, but have everlasting life."

The Banner of love which he lifted up was a banner for *the eye of the world.* "Look unto me, and be ye saved, all the ends of the earth.—The Son of Man is come to seek and to save that which was lost.—Not willing that any should perish."

The Sacrifice which he offered was in atonement for *the sins of the world.* "Behold the Lamb of God which taketh away the sin of the world.—He is the propitiation for our sins, and not for ours only, but for the sins of the whole world."

The Instructions of his gospel are instructions for *all the inhabitants of the world.* "Go ye into all the world and preach the good news to every creature." The doctrines which he taught, the duties which he enjoined, the ordinances which he instituted, have no peculiarities that fit them only for one place, one people, or one age of the world, but are like the light of the Sun, and the air we breathe, adapted to every period and every people, whether dwellers of Asia in the East, or of America in the West; whether enlightened by science and polished by learning, or wrapped in the gloom of barbarism and degraded in the brutal habits of savage life. And as his teachings are adapted to all, so they are intended for all; no one nation can claim a deeper interest than another in the love of the Saviour, or the blessings of salvation. He is the Redeemer of the world.

Plainly as all this is taught, and often as it is repeated in the Gospel, human folly and human bigotry have not unfrequently attempted to obscure the blessed truth. Men there have been, in every age, who have undertaken to examine the Divine Message by the torture of their

logic, and to measure the Ocean of Redeeming Grace with the scanty line of their own reason. Some have essayed to set bounds to the merits of the sacrifice of the Holy One of God, and to make merchandise or a monopoly of his salvation. Some would number the Israel of God, and have the gift of eternal life offered only to a determinate few. Others would deny the precious boon to all save such as find it at their hands, or seek it within their narrow pale. O the blindness and selfishness of man! An attempt to enchain and confine the light of the Sun, or to monopolize the vital air by which we live, would have been wise and salutary compared with such a perversion of the right ways of the Most High, such a derogation of the free grace and boundless love of Christ. He arose like the Sun to illumine the whole world with life-giving beams, and whosoever will receive that light shall be made wise unto salvation. He came to encircle the globe with an atmosphere of grace, as real and universal as the elemental air which encompasses sea and land, and whoso chooses to inhale that atmosphere hath eternal life.

All human beings have, or may have, an equal interest in Christ; all are, or may be, equally benefited and blessed through his grace. He is the Saviour of all. As the Sun of nature revolves and shines, not for a few select trees, or chosen plants, or favorite flowers, only, but for the vegetation of the whole globe;—as the tiny weed and towering pine, the rush in the marsh and the rose in the garden, the waving wheat and the rustling forest, share alike its genial influences;—as each leaf, each bud, each peeping blade, looks up and claims that Sun as its own Sun;—so every human being, whether Jew or Gentile, whether black or white, learned or ignorant, whether toiling in poverty or rolling in wealth, whether sweltering

beneath the line or shivering at the poles, may look up to the Sun of Righteousness, and say, Thou art *my* Sun! *my* Saviour!

## ANALOGY VIII.

*As the Solar Orb is an inexhaustible fountain of light and heat to the material world,—so the Sun of Righteousness is an inexhaustible fountain of enlightening and saving grace to the world of mankind.*

### Phenomena.

Connected with the great Solar Globe are many phenomena, many mysteries, which the science of man has labored in vain to understand and explain. Foremost among these are to be named the ceaseless and undiminished floods of light and heat which proceed from his sphere in every possible direction. How these are produced, and by what means they are perpetuated, are problems which remain unsolved to the present day. But of the fact of their constancy and perpetuity there is no room for doubt.

Under Analogy III., we adduced various and abundant evidences to prove that the Sun has been shining upon our globe from its remote and dateless origin;—that he warmed the chaotic deep, and drew up its vapors; that he balanced the clouds and poured out showers over the first emergent reefs; that he created the storms that swept over the primeval oceans, and the breezes that fanned the earliest continents; that he fostered the vegetation, and illumined the living tenants occupying both sea and land, through all the immeasurable periods of geology. And when Man, the last created of living beings, was brought forth, that glorious luminary was

still shining in the fulness of all its genial influences, adorning the chosen garden with all that was pleasant to the sight, and enriching it with all that was delicious to the taste. When, again, the prolonged ages of his degenerate race had slowly passed away, and the waters of the Deluge had erased the remaining traces of their violence and corruption, the Sun, in all his wonted vigor, poured down his quickening influences to cover the earth once more with grass for the cattle, and with fruits for the service of men. Other centuries roll by, and Moses leads the Israelites out of Egypt, to find the Sun, with undiminished powers, ripening the grape and the fig and the date on the hill-sides of Palestine. And when full thirty generations more had been carried away, and the fulness of time had ushered in the promised Messiah, that Sun was still exerting the same energies and producing the same results on those hill-sides, and beautifying the plains with the roses of Sharon, and the valleys with the lilies of the field.

And to-day, after shining thus for thousands and millions of years, pouring forth an ocean of light and heat on every side into the depths of infinite space, that Sun is as powerful to illumine and warm the face of Nature as when its descending rays first fell on the forming globe—as effectual to quicken and array plant and tree and flower as when it looked down and smiled on the fresh beauties of the new creation—as brilliant to lighten up our skies and reveal the charms of our scenery as it was those of Adam amid the bowers of paradise. His eye is not dimmed with age, neither is his natural strength abated. His floods of light and heat are none the less full for all the centuries and millenniums of profusion he has unceasingly poured forth. His energies, his resources all, remain unexhausted, undiminished.

## Teachings.

In all this the Sun of nature is both a beautiful and a faithful type of *the Sun of Righteousness, in whom is found an inexhaustible Fountain of enlightening, renewing and saving grace for the world of mankind.* Though, like the Sun of nature, he has been long shining and showering down the riches of his grace upon lost humanity,—though multitudes which no man can number have from age to age looked unto him and been saved—he is still as able to save as when the first ransomed soul entered heaven. His word is as powerful to enlighten, his heart is as tender to pity, his blood is as efficacious to atone, his love is as warm to embrace, and his Spirit is as freely offered and bestowed, at this day, as on the day of Pentecost, when thousands with one accord received the heavenly gift, praising God with gladness and singleness of heart. "He is the same yesterday, to-day, and forever."

As the flow of all the ages gone by has produced no perceptible change in the forces of the solar orb, so no lapse of time can affect the efficacy of the sacrifice made by Christ on the Cross. That was an offering *for all time*, as well as for all nations. "He needeth not daily, as the high priest, to offer sacrifices for sin; this he did Once, when he offered up himself." "He was Once offered to bear the sins of many." Nor can any series or succession of years, however long, weaken the force of his Truth, or in anywise make void the promises of his grace; these, like himself, change not. "Verily I say unto you, heaven and earth shall pass away, but my word shall not pass away."

As the illumination of the world for one eye would require nothing less than the Sun's light; and its illu-

mination for a million of eyes would require nothing more:—so the atonement made by Christ would have been necessary, in all its fulness and merits, had there been but one sinner to be redeemed; and now that there are millions of sinners to be saved, it requires no greater, no richer, no other atonement. Without that sacrifice not a soul could have been saved; with it all may, and if they look to him, assuredly shall be saved. "He is able to save to the uttermost all that come unto God by him."

As the resources of the Sun are in nowise affected by the numbers of those who partake of its benefits; that is, if these numbers were reduced by one-half, or if they were increased to double, the Sun would be neither richer nor poorer for the change,—so neither are the merits and grace of Christ affected by the numbers that are renewed and sanctified and saved thereby. In him is a Fountain that springs up eternal, and is forever full.

As the fact that the Sun illumined all the multitudes that looked upward, yesterday, does not lessen his powers to illumine equal multitudes to-day,—so the saving of unnumbered millions in the ages past does not leave the blessed Redeemer any the less able to save all the millions now upon the earth; yea, if these will but look unto him, their salvation will be sure. "Look unto me, and be saved, all the ends of the earth."

If a thousand eyes should be turned upward to the Sun in one and the same instant, all would be as fully and perfectly enlightened as if but a single and solitary eye looked at it.—so, if not one sinner only, but a thousand sinners, or even all the thousand millions of perishing men now on the earth, were to look up to Christ, in one and the same moment, he is infinitely able to hear them all, to bless them all, to save them all; and—all having been

saved—the resources of his grace, like those of the radiant Orb of Day, would still remain as glorious, as efficacious, and as inexhaustible as ever!

As the Sun of nature, by its gravitation, by its light, by its heat and actinism, contributes directly and indirectly through innumerable channels to the welfare of the world, so the Sun of Righteousness, by the dispensations of his providence and through the gracious influences of his Holy Spirit, works for the spiritual good of men in a thousand different ways. Present always, present everywhere, He overrules and directs all events, all agencies, to work together for good. O the riches of mercy and grace that are treasured up in Christ! Who shall declare them?—language and figures and comparisons utterly fail. The universe affords but one adequate or worthy symbol—*the immeasurable and universal outflow of the Sunlight.* "If one had art," says an eloquent writer, "to gather up all the golden sunlight that to-day falls wide over all this continent, falling through every silent hour; and all that is dispersed over the whole ocean, flashing from every wave; and all that is poured refulgent over the northern wastes of ice, and along the whole continent of Europe, and the vast outlying Asia, and torrid Africa; if one could in anywise gather up this immense and incalculable outflow and treasure of sunlight that falls down through the bright hours, and runs in liquid ether about the mountains, and fills all the plains, and sends innumerable rays through every secret place, pouring over and filling every flower, shining down the sides of every blade of grass, resting in glorious humility upon the humblest things,—on stick and stone and pebble, on the spider's web, the sparrow's nest, the threshold of the young foxes' hole, where they play and warm themselves; that rests on the prisoner's window,

that strikes radiant beams through the slave's tears, that puts gold upon the widow's weeds, that plates and roofs the city with burnished gold, and goes on in its wild abundance up and down the earth, shining everywhere and always since the day of primal creation, without faltering, without stint, without waste or diminution, as full, as fresh, as overflowing, to-day, as if it were the first day of its outplay;—if one might gather up this boundless, endless, infinite treasure, to measure it, then might he tell the height and depth, and unending glory of the grace and mercy and love of Christ. In Light—in the Sun, its source—you have God's own figure of the immensity and copiousness of his compassion and redeeming grace.'

When, from a chosen eminence, I have watched the coming of the morning Sun, and presently seen him, draped in purple and gold, rise above the summits of the eastern hills, bathing the whole landscape in his ethereal glow, I have been profoundly interested to think that he had thus daily illumined and warmed the whole face of the earth, through so many ages; and melted the ice and snows of so many winters; and quickened and renewed the verdure of so many springs; and arrayed in beauty and loveliness the flowers of so many summers; and ripened the golden fruits of so many harvests—and yet was shining on as brilliantly as ever; his floods of light and heat none the less full or glorious, for all the ages of profusion he had poured forth. Thus, I have said, shall the Sun of Righteousness shine on gloriously through the years and the centuries that are yet to come—melting the hard and icy hearts of men, quickening them into newness of life, arraying them in the ornaments of grace, and ripening their souls, like the fruits of autumn, for glory, honor and immortality; till the world, that is now as a

wilderness, shall flourish as the garden of the Lord, and blossom like the rose: yea, and when all this shall have come to pass, and that Sun in the firmament shall have been quenched in darkness, or been veiled in the smoke of a burning world, the Sun of Righteousness shall still shine on in his unclouded glories, and the riches of his grace shall be seen flowing forth throughout eternity in the abounding bliss of his saints, and in the joy of a ransomed Universe.

## ANALOGY IX.

*As the natural Sun is an unrequited benefactor of the earth,—so the Sun of Righteousness is an unrecompensed Benefactor of the human Race.*

### Phenomena.

The world in which we live, though composed of diverse materials, and these under the governance of opposing forces, yet is a system of interdependence and accommodation. Its sea and land and air, its growing vegetation and living tenants, are all closely related and mutually dependent. No province, no element, no being stands isolated, or independent. All minister, and all are ministered unto.

All the departments of Nature are both debtors and creditors—all both give and receive. Of this numerous illustrations may readily be given. The ocean, for example, sends upward its abounding vapors to form clouds and showers to water the dry land; and the dry land, having been refreshed, collects and returns the same to the ocean by a thousand noble rivers and innumerable minor streams. The animal kingdom, as before stated, manu-

factures, and with its every breath gives out carbonic acid gas, for the benefit of the vegetable kingdom; and the vegetable kingdom, through its every plant and leaf and spear, sets free oxygen gas for the service of the animal kingdom. The earth, through the day, imparts to the atmosphere its softening moisture; and the atmosphere, during the night season, returns to the earth the favor in its copious and refreshing dews. The soil freely and everywhere expends its richness to produce food for the animals that roam over its surface; and these animals, having run through their appointed round of existence, repay that richness with the dust of their own mouldering forms. The heated region of the equator sends, along the upper stratum of the atmosphere, a perpetual flow of warm air toward either pole, to mitigate the severity of its climate; and the poles, in return, send along the earth's surface, similar floods of cold air to moderate the intense heat of the equator. The moon reflects her light to the earth, to cheer the tedium and the darkness of her nights; and the earth to her neighbor returns the kindness by a reflection tenfold greater. Thus the various provinces and differing elements of our world comprise one great system of closely related and mutually dependent parts, all benefited and all benefiting.

Turning to the Sun, however, we discover no such pleasing interchange of favors carried on between that orb and the earth. Here the giving is all on one side, and the receiving all on the other side. The Sun sheds down daily innumerable benefits upon the earth—wheels her in her orbit, brings about her round of seasons, lights up her scenery, warms her soil, purifies her atmosphere, stimulates and fosters her vegetation, forms her clouds and showers, animates her living occupants, perpetuates the flow of her streams and fountains, creates her winds

and distils her dews; and, by means of all these, works ten thousand other benefits for man and beast through every hour of the day, and every day of the year. But we know of no return that the earth makes to the Sun for his favors. She sends back to him no ray of light, no breath of heat, no shower of rain, no drop of dew, no pulsation or throb of any influence whatever, save the faint one of her inherent gravitation. She is a recipient, and a recipient only. He gives, and ever gives, but nothing in return receives.

## Teachings.

As the material Sun is thus the unrequited benefactor of the earth, *so the Sun of Righteousness is the unrequited Benefactor of the human race.* All that he has ever done for man has been done without recompense or reward; and all that he has bestowed upon him has been bestowed as a free gift.

Human salvation, from first to last, is a work of *Grace.* What else could it have been? What first awakened the thought, or "formed the plan to save rebellious man?" What moved the High and Lofty One to forsake the bosom of the Father, to quit the region of eternal day, and to visit this nether world in such great humility? What prompted him to take upon him our lowly nature, and to work out our salvation at a cost of humiliation and suffering so deep and so dreadful? What but *grace*—but mercy and benevolence, pure, free, unbounded as the light of the Sun. To what else that is conceivable can we ascribe his wondrous career from the manger to Gethsemane—from Gethsemane to the Judgment Hall—from the Judgment Hall to the Cross! The humble creatures whom he came to redeem did not *deserve* that he should have thus become poor, a man of sorrows, a

subject of ignominy, suffering and death, in order to save them; they had no rights that they could urge, no claims that they could plead;—yea, they were sinners, enemies, righteously condemned: their desert was punishment—"Everlasting destruction from the presence of the Lord." Nor did he come thus to rescue our wretched race in the expectation of *a reward;* for well he knew that they had nothing to give but what was already his own. Nor did he come at *the urgency of their request*, overcome with their pleadings and tears; for they did not desire that he should do this for them:—fallen and benighted, they were too ignorant and stupid to know their own true interest or happiness; too depraved to have any taste or relish for it. Nor did he come because *he needed their service or their worship;* for at much lesser cost, even with a word, he could have created a thousand glorious worlds, all teeming with holy and happy inhabitants, ever ready and delighted to obey the slightest intimation of his will. Neither did he come because *their preservation was indispensable to his happiness or glory;* for had they and had the world in which they dwelt sunk into everlasting nothingness and oblivion, it would not have taken one ray from the effulgence of his glory, nor one drop from the ocean of his felicity. No, no.—To nothing, reader, to nothing that is conceivable can we ascribe the advent of the Son of God to our world, but to the disinterested benevolence and infinite benignity of his own heart.

The same spirit of surpassing benevolence characterized his whole life on earth. His time and strength were spent in "going about doing good,"—feeding the hungry, healing the sick, giving sight to the blind, and hearing to the deaf, and speech to the dumb, comforting the sorrowful, raising the dead;—many were the distresses that

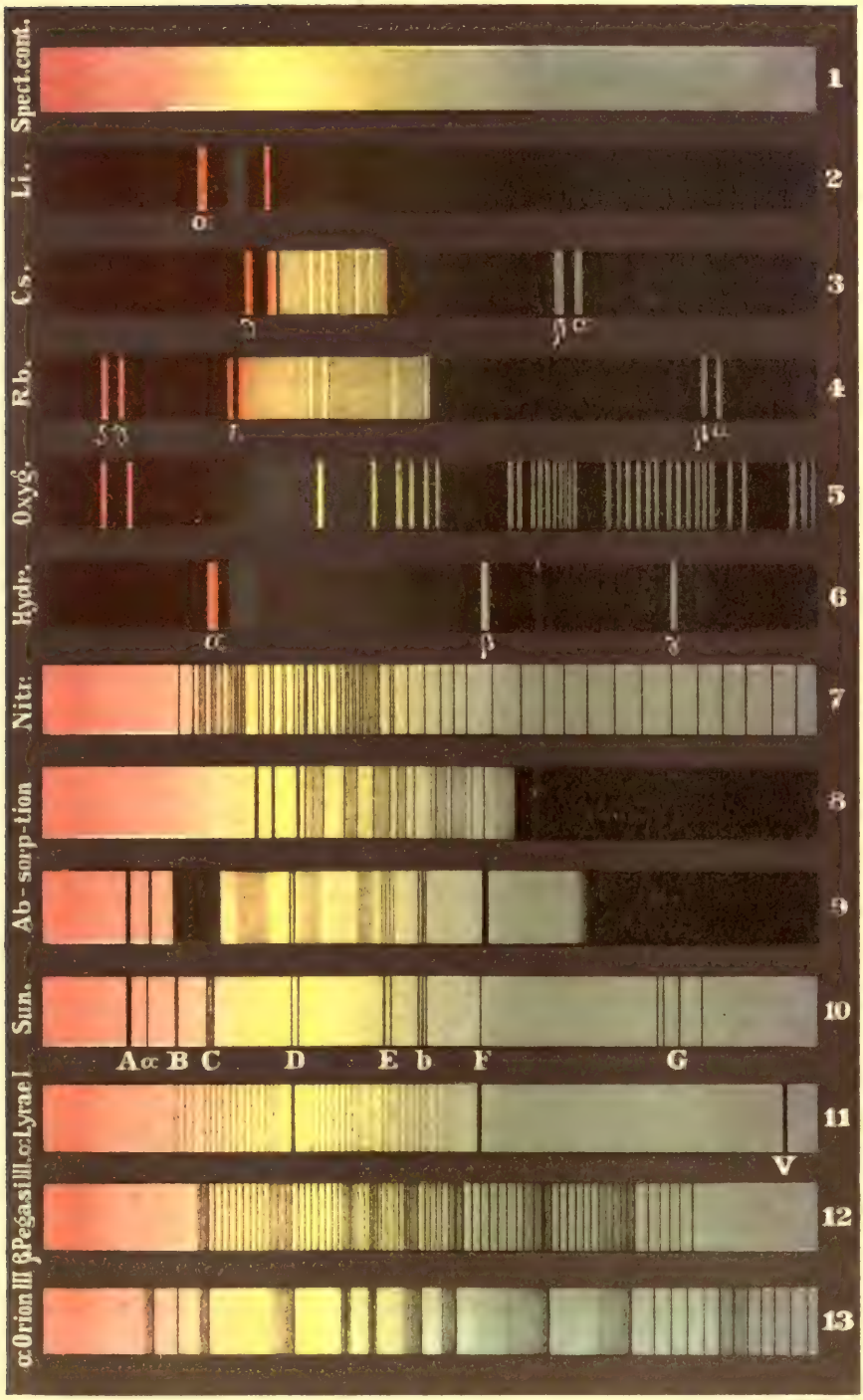
he relieved, many the tears that he wiped away, many the sad hearts that he made glad;—but his miracles of healing and kindnesses all were done without recompense or reward: done from the pure impulses of love and pity. His divine instructions, likewise, were equally gratuitous. Though the knowledge he imparted was beyond the price of rubies; though, at times, he had not where to lay his head; though, weary and wayworn, he had to solicit a cup of cold water from the hand of a stranger, yet he labored without money and without price; the only reward he desired was the tear of penitence, and the cordial reception of his message of love from the Father.

He stands in the same attitude still toward sinful men. He is content to remain their unrequited Benefactor. In all the dispensations of his providence and of his Holy Spirit toward us, he seeks our own welfare only; he is nothing profited. As the Sun of nature, in shedding down his light and heat to foster plant and flower and tree, receives no benefit in return, but simply nourishes and strengthens and expands them to receive larger measures still of all his benign influences, so the Sun of Righteousness, in bestowing upon us the healing of his wings, the riches of his grace, advantageth nothing; he simply promotes our spiritual growth and welfare. He is not, and cannot, in anywise, be a gainer by us. "Our goodness extendeth not to him." Our obedience and service add nothing to his possessions. Our prayers and praises contribute nothing to the essential glory of his nature. Our profoundest homage, or our loftiest adoration, impart nothing to his inherent and eternal happiness. In all our intercourse and communion with him, the advantage is all our own; on his part all is *grace*. He is ever the Benefactor, we ever the beneficiaries.

Whatever comes to us from him comes as a free gift from the abounding benevolence of his loving heart. As the Sun for the vegetation of the earth, so He sends down his healing, saving beams to quicken and nourish our souls, to promote our growth in holiness and happiness, to enlarge our spiritual capacities, that we may be qualified to receive still more and more out of his fulness. He seeks and saves and sanctifies sinful men, not to derive from them either profit or gain or advantage, but to make them larger partakers of his own felicity and glory—to make them more like himself, and to fit them to dwell with him forever.

# PLATE OF SPECTRA.

(see Page 218)



# PART SECOND.

## *THE SUN AS THE FOUNTAIN OF LIGHT.*

### ANALOGY I.

*As the Sun is a self-luminous globe, and sends forth from its own body and sphere a flood of light on every side,—so Christ, the Sun of Righteousness, was a self-luminous Orb, and poured the light of truth and wisdom upon all around him from the fountain of his own mind.*

#### PHENOMENA.

WHILE all the globes composing the great system of creation, to which our world belongs, shine more or less brightly in the heavens, yet all, save one, shine by borrowed or reflected light. The Sun alone is self-luminous; the rest, planets as well as satellites, are in themselves dark bodies, and become visible only by reflecting the light which falls upon them from the Sun.

The statement may appear surprising, perhaps incredible to some, that the moon which shines with such silvery brightness, and illuminates so beautifully our whole firmament at night, has no more light in herself than the dull earth upon which we tread. Yet this is the fact, as may be easily proved in various ways. The moon illumines simply as a *reflector;* it does nothing more in this way, than the pure white cloud which stands

off on the bosom of the blue sky. By day, the moon can hardly be distinguished in brightness from such a cloud; and in the dusk of the evening, clouds catching the last rays of the Sun appear with a dazzling splendor not inferior to the brightness of the moon at night.

When the moon, as at a solar eclipse, happens to come exactly between the earth and the Sun, and no ray of the Sun's light falls on the hither side of her globe, she is dark, and appears as a black spot on his disc, which, of course, would not be the case if she was herself a luminous sphere.

Again, when in the opposite point of her orbit, as at a lunar eclipse, the earth is exactly between the moon and the Sun, and she passes through the shadow of the earth, she then becomes all but invisible, and remains so till she emerges out of the shadow into the sunshine, when she again appears bright as before. Thus all the phenomena presented both in solar and lunar eclipses combine to demonstrate that the light of the moon is not inherent; in other words, that she is not self-luminous.

The regular monthly changes of the moon, from the full to the crescent, and from the crescent to the full, offer a similar conclusive proof that she shines only by reflected light. Being a globe, the Sun always illumines one-half of her surface; but that enlightened side is so situated, at different points in her orbit, that we see only a lesser or greater part of it; and hence her varying aspects as a new-moon, a half-moon, and a full-moon.

What is thus true of the moon is equally true of the planets; these likewise shine only by a reflection of the Sun's light. Venus, the brightest of them all, is a dark globe; and when viewed through a telescope, it appears, in the course of its revolution round the Sun, to pass through all the phases of the moon, sometimes appearing

as a half-moon, sometimes as a crescent, and at other times with a gibbous phase. When it appears of a half-moon or crescent phase, its enlightened side, like that of the moon, is always towards the Sun, which proves that it is in itself a dark body, and derives all its light from that luminary. Proof of this fact is also obtained during its transits. At certain distant and unequal intervals, Venus, like the moon, passes exactly between us and the Sun; and as it moves across his disc, it appears like a small dark spot on his bosom, its enlightened side being turned towards the Sun, and its dark hemisphere presented towards the earth. It is equally certain that all the other planets and satellites of the system are in themselves dark or non-luminous bodies.

Unlike the moon and the planets, which thus shine by reflection, the Sun has light in himself; he is a self-luminous globe, and sends forth from its own body and sphere a continuous flood of light on every side. His brightness is not at any period or in any degree dependent upon the light of another luminary; all the orbs that shine in the firmament add nothing to his brilliancy, and were they all extinguished they would take nothing from it. In all his apparent positions in the heavens the Sun shines full-orbed and with unvarying splendor. He is the one great fountain of light for the whole system. He gives light to all, but borrows from none.

## Teachings.

In all this we have a pleasing and instructive type of the Great Teacher. As the material Sun is thus a luminous globe, and sheds forth of his own inherent light on all around; *so the Sun of Righteousness was a self-luminous Orb, and poured the light of truth and wisdom upon men from the Fountain of his own Mind.* The light which

he possessed and imparted was not like that of the moon and planets, borrowed or reflected, but inherent. Like the Sun, he had light in himself; and like the Sun, he was independent of all other lights.

Jesus Christ was an *original* Teacher. He was not a copyist or an imitator: "never man spake like this man." The instructions which he delivered to the multitudes were not lessons, which human wisdom or learning had enunciated before; but truths born of his own divine and holy mind. The spiritual doctrines which he proclaimed, and the practical precepts which he enjoined, were neither borrowed from the ethics of Grecian philosophers, nor derived from the traditions of Jewish rabbies. To the former he was a stranger, and to the latter he was averse. He had listened to the discourses of no lyceum, had sat at the feet of no doctor of the law, had pondered over the volumes of no library. All his days had been spent in humble toil in the rude and retired village of Nazareth. He had been favored with none of the literary advantages of his time, such as they were. With the learned or the rich—with the ecclesiastical or civil authorities—with the influential classes of society, or even with single individuals of name and weight—he never had the most distant association. And that such wisdom as he manifested, such divine lessons as he delivered, should flow from the lips of an individual that had grown up amid such circumstances as his had been, was what astonished both the people and their rulers beyond measure. "Is not this the carpenter, the son of Mary!" exclaimed they: "How knoweth this man letters, having never learned?" No, he had not learned from such authorities as they referred to; he had never been enrolled among the scholars of Hillel, or Shammai, or Philo, or any other rabbi of his day. To these he owed

nothing. His knowledge and wisdom flowed from a far higher and purer source—*his own sinless and luminous Mind*, endowed with the powers of immediate insight into his Father's will, and imbued with supreme delight therein. Yes, the Fountain from which flowed that divine sermon delivered on the Mount, those inimitable parables spoken by the Sea, and all the sweet and precious truths recorded in the Gospels, was his own pure, holy and divine Mind.

Whilst the teaching of Jesus was thus original, both as to its matter and method, yet he disdained not the use of old and familiar truths whenever they subserved his gracious purposes; but even these, in passing through his hands, underwent such a transformation that they became as new truths—they were so recast from their worn-out forms that they came forth from his lips with all their original freshness and force. "Truths which the lapse of time had displaced and disconnected from their true positions, as stars are said to have wandered from their primal signs, he recalled and established anew; and principles which had faded, disappeared, and been lost, as stars are said to have become extinct, he rekindled and resphered, and commanded them to stand fast forever."

As the Sun stands alone, unrivalled in splendor by any orb of heaven, so Christ stood alone as a Teacher, unequalled and unapproached, in the wisdom, purity and benevolence of his doctrines. The sublime character of his instructions proved him to have been a Teacher sent forth from God. The revelations which he made were too profound, the truths which he proclaimed were too lofty, the motives which he proposed were too unselfish, and the spirit which he inculcated was too pure, to proceed from any *human* source. Such instructions as his ministry furnished had not been heard on the earth be-

fore; and such an illustrious example, as his spotless life presented, had never been witnessed among men. His conduct and converse, his temper and spirit, were ever in perfect harmony with the purity and excellency of his precepts. In deeds as in words, he exhibited the most finished pattern of universal holiness—of love to God, of zeal for his glory, of charity and benevolence, of self-denial, of meekness and patience, of humility and condescension and love. Never was there so perfect a code of religion and morals propounded, never so wise and amiable and godlike a Teacher seen among men! He was, indeed, a self-luminous orb, risen upon the darkness of the world, shedding new light upon every scene and relation of life, unfolding new promises and privileges in connection with every duty, and revealing new and cheering prospects to every weary pilgrim in his passage through the world.

Few appear to know, and fewer still to realize, what *a rich accession* was made to the stock of truth in men's possession by the teaching of Jesus—or, how vastly he enlarged the circle of their moral conceptions—or, how far in advance of all previous attainments he conducted them in the knowledge of God and of his religion. He found them groping as beneath the faint and reflected light of the moon and planets, but left them walking as in the direct and clear light of the Sun. How great the world's debt to the ministry of Jesus for the light it now enjoys!

To this Great Teacher, and to him alone, we owe our knowledge of the *Paternal character of God*. Of this, as we have seen in a preceding chapter, mankind had become deplorably ignorant. They knew God, so far as they knew him at all, as a Being to be *feared* rather than to be loved—as a King, supreme in authority, and

irresistible in power, and arbitrary in his conduct; or, as a Judge, inflexible in his justice and relentless in his retributions; or, at best, as a Being in a state of apathy towards the world of mortals, viewing with alike indifference their welfare and their woes. But Jesus Christ, who came forth from God, and knew God, reveals him in a character supremely amiable and adorable—reveals him as a *Parent* of surpassing love and tenderness, yearning over his erring offspring on earth, and longing to reclaim them all, and to fill them all with his own blessedness. He brings to us the assurance that, such was the deep compassion and love of God for the fallen and lost children of men that, he resolved upon a sacrifice of value and dignity and dearness surpassing all computation in order to redeem them from their guilt and misery; —"God," he tells us, "so loved the world that he gave his only begotten Son, that whosoever believeth in him should not perish, but have everlasting life." Yea, he goes beyond all this, and makes the astonishing declaration that, such was the Divine sympathy for ruined men, that the Father loved even HIM *the more* for his dying to redeem them;—"Therefore doth my Father love me, because I lay down my life for them." And having given this new and amazing view of the character of the Great Supreme, he taught us to address him by a *new name*—a name which should be at once a sign of our affection for him, and a pledge of his tender regard and relationship to us—the name which is intertwined with the dearest associations of the human heart—*Father*. "When ye pray say, OUR FATHER which art in heaven. Ask, and ye shall receive. If ye, being evil, know how to give good gifts unto your children, how much more shall your heavenly FATHER give his Holy Spirit to them that ask him?"—Here was a revelation, indeed, as *new* as it was

cheering—a revelation which could have come to us only from the inner consciousness of him who had been in the bosom of the Father from all eternity. The light of the Sun of Righteousness alone could have thus revealed the heart of God—that he is a Father, a true Father, a perfect Father—that *Paternal love* is the element in which he lives and reigns—that *Paternal love* is the moving and governing force in the spiritual universe, working out the largest possible measure of happiness for the whole intelligent creation.

To Jesus Christ, and to him alone, we owe all our correct and certain knowledge of the *human Soul*—of its reality, its greatness, its immortality and transcendent value. The doctrine of an indwelling *spirit* and of its future state of existence, previous to the Saviour's advent, was involved in great obscurity. To the mass of mankind, the Soul in its real nature, its noble attributes and eternal destiny, was practically unknown. The opinions of Socrates and Plato, of Cicero and Seneca, though often quoted, were at best but the conflicting conjectures of minds alternating between hope and fear. By their own acknowledgment they were often in distressing doubts on the subject.* Heathen philosophy

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* We find *Socrates*, the most hopeful of all the heathen sages, often employing such ambiguous language as the following: "*If* death be a removal hence to another place, and *if* what is said of the dead be true"—"Those who live in Hades are thenceforth immortal, *if* at least what is said be true"—"I go to die, you to live; but which of us is destined to an improved being is *concealed* from every one except God"—"I *hope* I am going to good men, though this I would not take upon me peremptorily to assert."

So *Cicero*, speaking of the two ideas, immortality and non-existence, could only say: "Which of these is true God only knows; and which is most probable a very great question. When I read the writings of Socrates and Plato, I assent to immortality; but when I have laid down the book, all that assent vanishes."

Nor was *Seneca* possessed of any stronger faith. "Immortality," said he, "however desirable, is rather promised than proved by those great men (Socrates and Plato)." Such was the lamentable hesitation and doubt of the wisest of men who had only the light of reason to guide them.

having descended to the entrance of the tomb, came to a stand; the force of all its reasonings could no further go. And even the revelation of the Old Testament Scriptures did little more than darkly hint at the doctrine of the Soul and its future existence; the light it held forth in the chamber of death did but flicker to the wisest and the best, while to the multitude, amid the deadly vapors of the sepulchre, it went out altogether. But Jesus Christ brought full and clear assurance of the reality and undying character of the Soul. It was in no doubtful terms or hesitating tones that he spake of it. He emphatically declared it to be in its nature distinct from the body, and capable of existing apart from it, and that it would so exist. "Fear not them," he said, "who kill the body, but are not able to kill the soul;" or, in other words, Persecutors may injure and destroy your bodies, but be not afraid of them, your souls they cannot harm, cannot reach by any of their instruments of cruelty; these will pass on secure to bliss and immortality. "Absent from the body, present with the Lord." The ministry of Christ from first to last was a proclamation of the soul and its undying interests. To him the soul was the *man*—the seat of all his distinctions, all his worth, all his dignity. And it was upon this view of the soul he based that notable and solemn appeal: "What shall it profit a man if he gain the whole world and lose his own soul? or what shall a man give in exchange for his soul?" For the soul he labored—for the soul he prayed—for the soul at last he laid down his life. The soul was ever his great concern. When he journeyed and when he rested, when he stood in the busy market-place, or reclined by the festive board—on all occasions—he spoke to men of the forgotten, neglected soul. It is real! was his cry; it is great! it is precious! The body shall die,

but the soul shall live. The earth and the heavens shall pass away, but the soul shall endure forever, in sin and misery, or in holiness and bliss. And to impress all this the more deeply on men's minds, he even lifted the veil which divides from earth the spirit world, and exhibited departed souls still in conscious existence—the rich man in torments and despair beyond the great gulf, and Lazarus tranquilly reposing in the bosom of the Father of the faithful. Such was the *new* and *clear* light shed by the Sun of Righteousness on this most important subject—a subject which had ever been involved in painful obscurity.

To Jesus Christ, and to him alone, we are indebted for *the true meaning and spirit of the Moral Law.* When he appeared in the world, this Law was virtually lost to the Race; the Heathen knew nothing even of its letter, and the Jew was equally ignorant of its spirit. Human laws, for reasons that are obvious, can take cognizance only of the outward acts of men; and the Scribes and Pharisees had come to regard, and to interpret to the people, the Law of God in much the same light, limiting its jurisdiction to the external conduct; nor did they stop here, but in numerous cases set it aside altogether by their trivial and unmeaning "traditions," or purchased for themselves a dispensation to transgress it, at the easy price of a little additional punctiliousness in their ritual worship. Thus the Divine Law was lost sight of, being buried beneath the corruptions and traditions of men. But Jesus Christ, brushing away this accumulation of worse than dust and cobwebs which obscured and made of none effect the commandments of God, restored them to their original purity, and expounded them in their true spirit. The Law, he taught, "is exceeding broad;" it is spiritual, and speaks to the soul;

it is designed to govern the soul as well as the body—the inward thoughts and motives, passions and emotions, as well as the outward words and actions. He showed that the Law recognized and laid its hand upon evil, in its germ, in its earliest rudiments of thought and feeling—that it condemned causeless anger, though unexpressed and unbreathed, as partaking of the spirit of murder, and the wanton glance as the commission of adultery already in the heart. He declared the Law of the Lord to be perfect;—that it not only prohibits the act and essence of all evil, but also requires the spirit of all good—*love;* that wherever love, love supreme to God and love sincere to man, is wanting, the demands of the Law remain unsatisfied; for "love is the fulfilling of the Law." Such was the *new* light shed by the Sun of Righteousness upon the meaning and spirit of the Moral Law.

To Jesus Christ, and to him alone, we are indebted for our instruction in *the true and acceptable worship of God.* What gross ideas and corrupt practices the heathen nations followed in their worship, we have before shown; and that the religion and worship of the Jews, as to their spirit, had come to stand but little higher, we have also proved.* People, that could put such a carnal construction on the law of God as we have just seen, would naturally be content with equally carnal worship. The sacrifices and ceremonies prescribed by Moses were, indeed, still observed in the temple; but with these they had gradually incorporated so large an admixture of what was false and superstitious and absurd, that they had lost their force and significance. The observance of rites and irrational traditions had come to be regarded as the sum and substance of religion and worship. "It seemed to be imagined that the service of God required no intellect,

* See under Analogy V., Part I.

no conscience, no heart, no spiritual nature; but only eyes, hands, lips, features of the countenance, movements of the body." So carnal, so darkened had even the chosen people become, when the Teacher sent from God appeared among them. The evil of their case was desperate, and called for prompt and decisive steps for its remedy. Accordingly, placing himself between the Mercy-seat and the crowd of heartless worshippers that beset it, Jesus showed them the idleness of their formal ceremonies, bade them cease their endless repetitions, and boldly lifting the veil which concealed their hearts, said, "Ye hypocrites! well did Isaiah prophecy of you, saying, This people draweth nigh unto me with their mouth, and honoreth me with their lips, but their heart is far from me. But in vain do they worship me, teaching for doctrine the commandments of men." To expose the folly and futility of such carnal devotions, he made the awakening announcement, "God is a Spirit, and they that worship him must worship him in spirit and in truth;" which was to say, The only devotion compatible with the nature of the Spirit God is that which flows from the spirit or soul of the worshipper: when ye come before him, he requires that the soul, the noblest part of your nature, should do him homage; that your thoughts should be occupied with him, that your affections should embrace him, and that your whole spiritual nature should go forth and seek communion with him. Plainly and solemnly did he declare unto them, that the worshipper, going through the attitudes and signs of devotion, uttering the affecting language of confession or supplication or praise, while his heart within was devoid of corresponding emotions, *would be sent empty away;* while the truly sincere, though he only cry, "God be merciful to me a sinner," *would return to his house justified, blessed, happy.* Thus

did Jesus teach men that the most costly gifts and the most pompous ceremonials may prove but a vain sacrifice; while a look, a sigh, a tear, may carry in it true and accepted worship.—This, again, was *new* light; never before had this important subject been so illumined.

To Jesus Christ, and to him alone, we owe our knowledge of the *Divine Providence.* Of God's care and rule over the world, or over his creatures in it, the heathen nations had no correct knowledge or worthy idea. To one class among them the Deity was but a figment of the imagination; and consequently his providence could have been but a figment likewise. Another class multiplied him into numerous rival divinities, from whose conflicting sway neither safety nor comfort could be inferred. Another class still conceived his throne to be removed to such a distance as relieved the world of both his government and his presence, and that he was so absorbed with his own dignity and repose that neither the wants nor the doings of human beings ever occupied his attention. To the heathen, the great mass of mankind, therefore, there could be no such a thing as Providence in any proper sense of the word. And to the Jews, the Divine Providence had become little else than arbitrary interpositions in the affairs of men, or occasional favoritism toward their own nation.—Widely different from all this is the Divine government of the world, as revealed beneath the light of the Sun of Righteousness. He teaches men to regard God as their Father, and the world as being under his unremitting supervision and care. Illuminating the face of creation, he reveals God in active communication with every part of his vast dominions, and working for the universal weal through a thousand different agencies, "making his sun to rise on the evil and the good, and sending his rain on the just and on the unjust;"—reveals

him as overruling all things affecting his people so that they work together for their good;—reveals him as concerned in the welfare of all his creatures, listening to their every cry, providing for their every want;—reveals him even as feeding the fowls of the air, painting the lilies of the field, and numbering the very hairs of every head. Having thus exhibited the fair face of Nature everywhere animated by the living, active presence of its Maker, he turns to his entranced listeners, and teaches the *lesson* of providence with a force and clearness, such as neither philosopher, nor sage, nor prophet ever approached:—"Therefore I say unto you, Take no thought for your life, what ye shall eat, or what ye shall drink; nor yet for your body, what ye shall put on. Is not the life more than meat, and the body than raiment? Behold the fowls of the air: for they sow not, neither do they reap, nor gather into barns; yet your heavenly Father feedeth them. Are ye not much better than they? And why take ye thought for raiment? Consider the lilies of the field, how they grow; they toil not, neither do they spin: and yet I say unto you, that even Solomon in all his glory was not arrayed like one of these. Wherefore, if God so clothe the grass of the field, which to-day is, and to-morrow is cast into the oven, shall he not much more clothe you, O ye of little faith?"

To Jesus Christ, and to him alone, are we indebted for our knowledge of the *Dispensation of the Spirit.* This great doctrine had its origin in the mind of Christ, and its first announcement from the lips of Christ. The gift of the Spirit, indeed, in a limited measure, a mere earnest, had been enjoyed under the Jewish dispensation; but the Dispensation of the Spirit *proper*, Jesus tells the disciples, was to commence from the date of his glorification, or return to the Father. "I go my way to him that sent

me—but because I have said these things unto you, sorrow hath filled your heart. Nevertheless I tell you the truth; It is expedient for you that I go away: for if I go not away, the Comforter will not come unto you; but if I depart, I will send him unto you." Accordingly, when "he ascended up on high, leading captivity captive, he gave gifts unto men"—that is, he sent down the Spirit in the fulness of his gracious influences, as he had promised; and the immediate result was the conversion of thousands of sinners. Our Saviour made several other most important declarations concerning this Dispensation. He stated and promised that the Spirit should remain with the church to give similar efficacy to the Gospel wherever preached: "And he shall take of the things of Christ, and show them unto men;" that is, he shall so apply the Gospel as to enlighten the minds and quicken the consciences of men, "convincing them of sin, of righteousness, and of judgment." He declared the absolute necessity of regeneration by the Holy Spirit, no less to the Jews than to the Gentiles: "Verily, verily, I say unto you, except a man be born of water and of the Spirit, he cannot enter into the kingdom of God;" and the result of this new birth would be, a new and spiritual character—"that which is born of the Spirit is spirit." He gave the promise that the Holy Spirit should dwell in the hearts of his followers for their sanctification and comfort: "I will pray the Father, and he shall give you another Comforter, that he may abide with you forever, even the Spirit of truth; he will guide you into all truth." He declared the Holy Spirit to be a special object of prayer, and gave full assurance that whosoever would pray for him sincerely and earnestly should receive him: "Seek, and ye shall find—Every one that seeketh findeth—If ye being evil know how to give good gifts unto your children,

how much more shall your heavenly Father give the Holy Spirit to them that ask him?" And, finally, he announced that the crowning effect of the operations of the Holy Spirit would be to glorify him as the Saviour of the world: "He shall glorify me;" this the Spirit would do by rendering Christ the object of supreme affection and delight to every believer; and believers would go on multiplying till, in the fulness of time, the human race at large would be led, as with one heart and one hand, to "crown him Lord of all."—Here, then, was a most wonderful and most gracious doctrine, and a doctrine, too, which had never been sounded in the ears of men before. All these declarations as they dropped from the Saviour's lips were *new truths, new light,* and opened up new privileges and prospects to the church and to the world. That the Holy and Divine Spirit should thus dwell with man, reigning over his will and conscience and all the powers of the soul, and sweetly harmonizing all the affections of his heart with the will of God, is a conception which never dawned upon the human mind until Jesus of Nazareth taught it to his humble disciples.

To Jesus Christ, and to him alone, we owe our assurance of the *Resurrection of the Body.* Of this doctrine the heathen nations knew nothing; when the idea was broached by the apostle Paul to the learned Athenians, we are told that they "mocked," deeming it a notion too absurd to admit of an argument in its refutation. And the same apostle, in his defensive address before Festus, Agrippa and Bernice, and the chief captains and principal men of Cesarea, informs us that his noble audience "deemed it a thing incredible that God should raise the dead." Among the Jews, indeed, some vague notions of a resurrection from the dead had long been floating; and the Pharisees of our Saviour's time held and taught the

dogma of a partial resurrection, while the Sadducees denied it altogether. Thus, all that was known on this profound subject previous to the ministry of Christ, was crude and uncertain, and practically of no influence. It remained for him to state, illustrate and establish this grand doctrine. Not until He announced it was it known to the world that "There cometh an hour in the which all that are in the graves shall come forth; they that have done good to the resurrection of life, and they that have done evil unto the resurrection of damnation." Not until they witnessed, at his almighty bidding, those who had expired come back to life again, and those stretched upon the bier sitting up and beginning to speak, and those who had been buried come forth from the sepulchre bound hand and foot with grave-clothes—did men see and know the power that was able to vanquish death, and to restore to life and loveliness from the wreck and ruin of the tomb. And not until he himself had risen from the dead, was the proof of this glorious triumph fully wrought out—when, on the morning of the third day, in the presence of adoring angels, he roused, and rose from his rocky resting-place, and stood at the mouth of the sepulchre, radiant with immortality, then the doctrine of the Resurrection of the Dead was fully and forever established. "Now is Christ risen from the dead, and become the first fruits of them that slept." Glorious triumph! "O death, where is thy sting? O grave, where is thy victory?" How sublime the prospect, how inspiring the hopes, which the Sun of Righteousness reveals to us, even through the dark portals of the tomb!

To Jesus Christ, and to him alone, do we owe our information concerning *the circumstances, the process, and the issue of the final Judgment.* The doctrine of a future judgment did not, indeed, originate in the teaching of

Christ; it had been early revealed to the Jews that "God would bring every work into judgment;" and even some of the wise among the heathen conceived that such an adjudication would take place. But to both Jews and heathen, the event was but obscurely seen, as amid dark and distant clouds; all particulars, and the person of the Judge, the process and principle of the judgment, the circumstances attending it, and the solemn and affecting results, were unknown to them; for these we are entirely indebted to the Lord Jesus Christ. He first announced to the world, that Himself will be the Judge of the quick and the dead—that "the Father judgeth no man, but hath committed all judgment to the Son"—that "he shall come in the clouds of heaven, in his own glory, and in the glory of his Father, and of all his holy angels, with a great sound of trumpets"—that "before him shall be gathered all nations"—that "there is nothing covered which shall not then be revealed, or hid which shall not be made known"—that "every one shall receive the things done in the body, whether it be good or bad"—that even "for every idle word men shall speak, they shall give an account on that day"—that the widow's two mites, and even the cup of cold water, shall not go unrewarded—that "it will be more tolerable for some than for others in that day"—that "he who knew his Lord's will and did it not, shall be beaten with many stripes;" and "he who knew it not, and did things worthy of stripes, shall be beaten with few stripes"—that those who had enjoyed lesser light and privileges shall arise in judgment and condemn those who had neglected or abused greater light and privileges—that "the angels shall come forth and sever the wicked from the righteous, and shall separate them one from another, as a shepherd divideth his sheep from the goats"—that "the Judge shall say to them on

his right hand, Come, ye blessed of my Father, inherit the kingdom prepared for you from the foundation of the world; and to them on his left hand, Depart from me, ye cursed, into everlasting fire, prepared for the devil and his angels"—that "these shall go away into everlasting punishment, but the righteous into life eternal." All these are facts, connected with the proceedings of the great day, which we owe to the teachings of Jesus Christ. Never before had the pomp and circumstances, the principles and issues of the final judgment, been thus plainly and fully stated. Never had the solemn scene been so minutely and so vividly portrayed before men.

Such is a summary, but an incomplete one, of the principal doctrines taught by Jesus Christ, which were *new* to mankind; doctrines that were alike novel and surprising to all who heard them:—The paternal character of God, his deep love and tender pity for erring and perishing men—The soul of man, its reality, greatness, immortality, and transcendent value—The perfection and holiness of the Divine Law, its authority over the workings of the inward no less than over the outward man—The true worship of God, its source, its nature and spirit—The Providence of God, its all-embracing nature and unremitting agency—The Dispensation of the Spirit, his abiding presence with the church, his agency in the conversion of sinners and the sanctification of saints—The Resurrection of the Dead, its proof, its universality, and its glorious results—The final judgment of all, its attendant circumstances, its process, principles and solemn issues. All these interesting and momentous Doctrines, and numerous others connected with them, we owe to the teachings of Jesus Christ alone; as they dropped from his lips they were *new truths* and *new lessons* to the world, and such as the wisest and brightest souls that went

before had never conceived, yet truths and lessons which flowed from his luminous mind with equal ease and naturalness as flow the rays of light from the Sun in the heavens.

These are doctrines not to be found in any system of human philosophy; doctrines which have no place in the sayings of Socrates, or Plato, or Cleanthes, or Zeno, or Epictetus. And not only that, but we look in vain for them even in the Old Testament Scriptures, in anything like the pure and spiritual and exalted character in which they were put forth by the Lord Jesus. The universality, the simplicity, the fulness, the radiant and overflowing benignity of his teachings, are without a parallel, and without a semblance. These are characteristics which exalt the Gospel of Christ immeasurably, not only above all philosophic sayings and writings, but even above all the Divine Oracles of the earlier ages. He stands incomparably above all that had ever been inspired with a message, or honored with a mission, to our sinful world. From his Divine Mind there shone forth a light, which neither Egypt, nor India, nor Greece, nor Rome, nor even Palestine itself, had ever seen or known before. Great and blessed, indeed, was the tide of illumination which flowed in upon the world with the advent of Messiah, with the rising of the Sun of Righteousness.

What glory crowns the Master's Head!
Majestic, like the Sun,
He gives a light on quick and dead;
He gives, but *borrows none.*

## ANALOGY II.

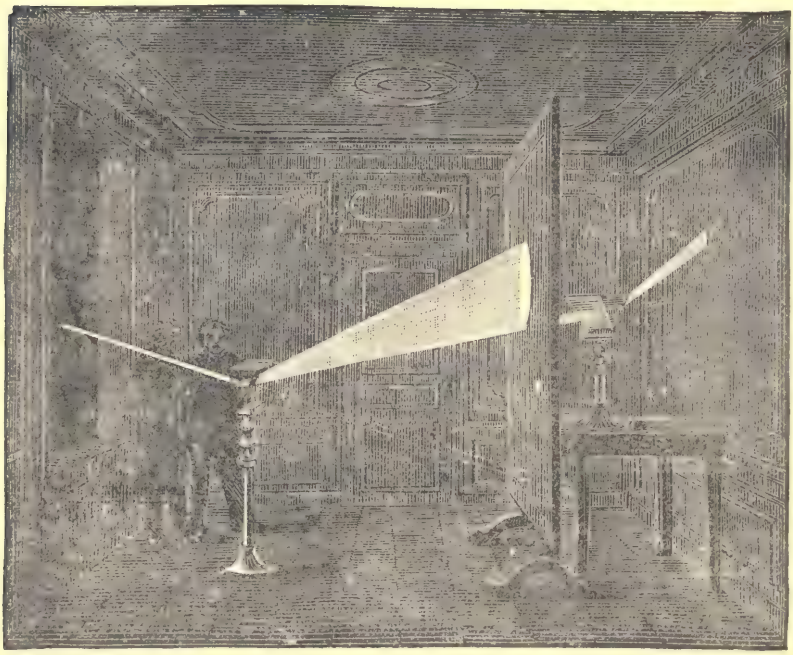
*As the Light of the Sun of Nature combines in itself every possible shade of color,—so the Character of Jesus the Sun of Righteousness embraced every possible grace and virtue.*

### Phenomena.

The world in which we live, as is manifest to all, is a globe composed of many and diverse substances; and so are all its distinctive parts and appendages. We know of nothing belonging to it, in its natural state, that is *simple*, or uncompounded. Everything that we see, or feel, or handle, is a composition or mixture of different elements. The arable soil and the solid rocks are such. So also are all the waters of the earth, whether seas or lakes or rivers. Even the atmosphere we breathe is a compound substance, being a mixture of four distinct elements. And what is more wonderful still, *light*, the pure white light of the Sun, is a compound thing; every ray or beam from the Sun may be divided and subdivided into many perfectly distinct rays. A ray of light, indeed, is a very complex and marvellous thing—it is a world in miniature.

The first philosopher who showed that *white light* is a compound of *light of many different colors* was Sir Isaac Newton. This he proved in the following manner: having made a room perfectly dark, he pierced a hole through the window-shutter, and allowed a thin sunbeam to pass through it. The beam formed a round image of the Sun on the opposite white wall of the room. In the path of this beam he placed *a prism*, or a three-sided bar of clear glass, expecting to see the beam refracted, or bent in its course, and also expecting to see the image of the Sun, after refraction, round, as before; but to his astonishment, it was drawn out to an image whose length was five

times its breadth; and this image, which he called a spectrum, was divided into bands of different colors, resembling a narrow cross section of a bright rainbow. From this the clear and penetrating mind of Newton at once inferred that the solar light was *composite*, not simple. This image revealed to him the fact that some constituents of the solar light were more deflected by the

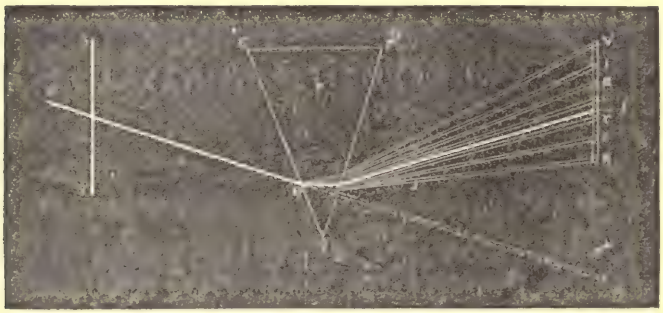


NEWTON EXPERIMENTING WITH LIGHT.

prism than others, and he concluded, therefore, that white solar light was a mixture of lights of different colors and of different degrees of refrangibility. He divided the spectrum into seven parts, *red*, *orange*, *yellow*, *green*, *blue*, *indigo*, *violet;* and these are commonly called the seven primary or prismatic colors.*

* See Part II., Analogy VIII.

To make this beautiful experiment perfectly plain, the reader is referred to the annexed diagram. In this figure A B represents the course of the pencil of solar light passing through the window-shutter S S. The prism P is so placed as to intercept the light. Now, if the prism were removed, the light would fall at *i*, and make a small elliptical image there. And if the solar light were simple instead of being composed of rays of many different colors, it would follow such a course as is indicated by the bent line, and form a small elliptical image at *i'*—this image being white like that at *i*, and resembling it



EXHIBITION OF THE SOLAR SPECTRUM.

also in shape. This was what Newton expected when he began his experiment; but instead of this, a streak of light was formed, as from V to R, exhibiting all the seven colors above named. It will be observed from the diagram that the violet rays, which fall at V, are the most refrangible or bent by the action of the prism; the red rays, which fall at R, the least; the others fall respectively at the points indicated by their initial letters in the figure.

Now, if white light is a mixture of the various colored rays of the spectrum, we would reasonably expect that these, being recombined, would form white light again;

and this is found to be the fact. Let the spectrum be made to fall upon the anterior surface of a large lens, so that all the various-colored rays shall be collected and reblended on the posterior side, they will form there an image of as pure white light as the original.

If, however, some, or even one, of the colored rays be intercepted, and not allowed to fall on the lens, the image formed by the combination of the others *will not be white*, but bear a tinge corresponding to the colors abstracted. For example, let the red and orange rays be cut off, and the mixture of the remaining rays will be a *greenish* mixed color. Let all the rays be cut off, except the red and orange, and the mixture will be a *reddish* colored image. And now, let these two colored images, the greenish and the reddish, which together embrace all the seven prismatic colors, be combined and blended, and you have again an image of *pure white.*

The above facts plainly and conclusively prove that the light of the Sun is a combination of rays of all the colors of the rainbow; that all these are essential to its purity; and that one being absent, its perfection is impaired.

## Teachings.

Now, as the light of the Sun of Nature thus combines in itself every possible shade of color, *so the character of Jesus the Sun of Righteousness embraced every possible grace and virtue;*—his was a perfect character, and one to be imaged only by the pure white light of heaven. "He was the true Light."

In Jesus Christ we have a character that *stands alone;* in all human history we can find none like it; it is entirely unique. Such a character had never even been described; the fertile imagination of poets had never con-

ceived its equal or its like. No Greek or Roman philosopher had ever proposed in theory a standard of morality so pure and so perfect as he not only taught, but daily practised. His teachings were but a reflection of his own divine life. In the constellation of the world's great and wise and good men, Jesus of Nazareth is not a star that shines a little brighter than the rest, but a Sun in whose light the stars grow pale and dim.

In Jesus Christ we have *a sinless character*. From the fall of Adam until the day of his advent there had never been a human being who had kept himself free from the contamination of sin and guilt. "All had sinned and come short of the glory of God." The wisest and best among the heathen—Socrates, Plato, Seneca, Epictetus, Plutarch, Marcus Aurelius—all felt and all admitted their imperfection. Nor can we find a perfect man among the most devoted of Scripture characters; Noah, Abraham, Job, Moses, David, Isaiah, and Daniel confessed and bewailed their manifold sins and transgressions against the holy law of God. But in Jesus Christ we behold a character without sin. "He did no evil, neither was guile found in his mouth." He never had to retract a word, never to regret a deed, never to ask pardon of God or man. Though living in a corrupt age and in the midst of a very wicked people, and though tempted in all points like as we are, yea and much more, yet he was without sin. He never did an injury to a man; and he never resented an injury done to himself—when he was opposed, "he endured the contradiction of sinners" in silence, and "when he was reviled, he reviled not again;" he never uttered an untruth; he never practised a deception; he never neglected a duty. He was absolutely unconscious of sin. He could challenge his keenest enemies to prove aught against him—"Which of you convicteth

me of sin?"—was his calm and fearless demand of them. Yea, he could appeal to his Father in heaven, that he had accomplished all duty and fulfilled all righteousness —"I have glorified thee on the earth; I have finished the work which thou gavest me to do."—Never before, never since, trod the face of the earth a being so pure, so holy, as the man Christ Jesus.

Again: In Christ we see *a perfectly balanced character.* As in the spectrum of the sunbeam, no ray is either in excess or in deficiency, so as to impart a tinge to the combination of the whole, but each is so meted and balanced with all the rest as to produce a purely white image; so in Christ, all the elements of his being, his intellect, his conscience, his affections, and his sympathies were in such perfect equipoise as to result in a faultless character. In human beings, even the wisest and the best, we rarely see an approach to a well-proportioned and well-sustained character. If they near the standard, in one particular, they fall short of it in another. In cherishing this or that virtue, they forget or neglect others that are equally important; so that the goodness they seek to attain ever proves a defective and unequal development. But in the wondrous Person we are contemplating, we see every human virtue in perfection, and all moral excellences in even balance. Everywhere and in all things, intellectually and morally, socially and personally, in relation to his kindred and his disciples, to his friends and his enemies, he always acts up to our highest ideal of perfect humanity.

In the Lord Jesus we likewise behold *a complete and harmonious character.* To it nothing is wanting, in it nothing is discordant. It is a blessed unity. As in the sunlight, rays of many differing colors—red and blue, orange and indigo, yellow and violet, violet and

green—unite and blend in one pure white image; so in Christ, virtues and graces that stand in greatest contrast meet and harmonize in one sweet and divine character. In him we see the most diverse moral excellences blending in one spirit—conscious greatness blending with unfeigned humility; abiding firmness of purpose, with the most yielding gentleness; perfect justice, with the freest mercy; true dignity, with genuine condescension; indignation against sin, with weeping compassion for the sinner; a devout walk with God, and a friendly walk with man; unyielding resolution in duty, with serene resignation in trial; courage which no array of dangers could deter, with tenderness which was ever attentive to the faintest appeal of misery; supreme regard for the interests of the soul, with unfailing attention to the welfare of the body. Moreover, in Jesus we see the union of traits more diverse and wondrous still—sympathy that could weep with the bereaved, with energies that could call back to life their dead; a presence from which devils in confusion fled, with gentleness that invited little children to his arms; excellency that commanded the homage of celestial visitants, with the compassion that could receive with joy the tribute of a sinful woman's tears; authority that could summon to his aid legions of angels, with submission to the suffering of death, even the death of the cross; justice that could have consumed his enemies as stubble, with forgivingness that could pray for them with his dying breath. In a word, in Jesus Christ, we behold blended a greatness and goodness and majesty with a humility and compassion and love, such as eye had never seen, nor ear heard, nor mind of man conceived before.

Never man lived, and never man died, like this man. He stands alone in the perfection of his character and the purity of his life. The life and character of Christ

have not simply received the approval but commanded the admiration of men of all conditions and of all grades of culture, and notably of those who stand confessed among the wisest and the best. To every lover of God and of virtue, through all the ages since, whether literate or illiterate, whether an Onesimus in bonds or a Paul in freedom, whether a Fenelon among courtiers or a Newton among philosophers, Jesus of Nazareth has been a Being of supreme moral beauty and loveliness. Nor has his excellency failed to wring expressions of unqualified praise even from the most intellectual and refined among those who have refused to yield him their hearts. Even Pilate was forced to say, "I find no fault in him;" and the same has been the verdict of many a judge of the like spirit since his day.

"In Christ," says *Chubb*, a noted Deist of the seventeenth century, "we have an example of a most gracious and benevolent temper and behavior. One who did no wrong, no injury to any man, in whose mouth was no guile; who went about doing good, not only by his ministry, but also in curing all manner of diseases among the people. His life was a beautiful picture of human nature in its native purity and simplicity; and showed at once what excellent creatures mén would be, when under the influence and power of that gospel which he preached unto them."*

*Goethe*, though he refused to be classed with Christians, yet gave utterance to this very decisive statement—"The human mind, no matter how much it may advance in intellectual culture and in the extent and depth of the knowledge of nature, will never transcend the height and moral culture of Christianity, as it shines and glows in the Person of its Founder."†

* Chubb's *True Gospel*, Sect. VIII., p. 55. † *Gesp. mit Ecker*, III., 373.

*Napoleon I.*, after his great achievements and great fall, among many other striking things, said, "I search in vain in history to find one equal to Jesus Christ, anything which can approach the gospel. Neither history nor humanity, nor the ages, nor nature, offer me anything with which I am able to compare it or explain it."*

*Strauss*, the learned German antagonist of the gospel history, is constrained to admit that "Jesus represents, within the sphere of religion, the culmination point, beyond which posterity can never go, yea, which it cannot even equal. He remains the highest model of religion within the reach of our thought."†

We have an equally just and even more eloquent testimony to the character of Jesus, from the pen of the celebrated *Rousseau*, an infidel of world-wide reputation, from which we present this extract: "I confess to you that the purity of the gospel has its influence upon my heart. Peruse the works of our philosophers, with all their pomp of diction; how mean, how contemptible are they, compared with this! Is it possible that a book, at once so simple and sublime, should be merely the work of man? Is it possible that the sacred personage, whose history it contains, should be himself a mere man? . . . What sweetness, what purity in his manners! What an affecting gracefulness in his delivery! What sublimity in his maxims! What profound wisdom in his discourses! What presence of mind in his replies! How great the command over his passions! Where is the man, where the philosopher, who could so live, and so die, without weakness and without ostentation? . . . What prepossession, what blindness must it be to compare Socrates to Jesus! What an infinite disproportion

* Schaff's *Person of Christ.* † Ibid.

is there between them! . . . Yes! if the life and death of Socrates were those of a sage, the life and death of Jesus were those of a God."*

And the brilliant but skeptical Renan delivers himself of this beautiful tribute: "Whatever may be the surprises of the future, Jesus will never be surpassed. His worship will grow young without ceasing; his legend will call forth tears without end; his sufferings will melt the noblest hearts; all ages will proclaim that among the sons of men there is none born greater than Jesus."†

## ANALOGY III.

*As the light of the Sun, fall upon whatever impurity or corruption it may, remains uncontaminated,—so Christ, the Sun of Righteousness, mingle in the company of sinners, of whatever class or grade he might, came forth from among them immaculate and untainted.*

### Phenomena.

Of all the agencies that affect or pertain to the globe upon which we dwell, Light, the Sun's Light, is the most refined and ethereal. It is unlike all other earthly elements, in that it is incorruptible and unchangeable. Water may become impregnated with the solution of many deleterious substances, so that its odor may become pestiferous, and its taste fatal; and air, the air we breathe, may become loaded with noisome vapors, or mingled with deadly gases; but the sunlight is insusceptible of any such injurious change or combination. It may, indeed, be deflected from its course, or be partially intercepted, or be excluded altogether; but its nature and composition, in whatever

* *Emilius*, vol. ii., p. 218. † *Life of Jesus*, in fine.

degree it prevails, remain unchanged. It is incapable of injury, or taint, or corruption. The mightiest forces of Nature cannot affect it. The ocean may roar and be troubled, storms may rush and whirl through the air, and pestilences may sweep over the land; but the sunlight continues pure and unaffected by either.

Nor has season or locality, elevation or depression, cold or heat, any influence or power over light. Whether it falls on the snowy crest of Hermon, in winter, or in the heated depth of the valley of Jordan in summer; whether it plays among the vine-clad hills of Galilee, or beams down upon the sullen surface of the Dead Sea; it is always, and everywhere, the same pure and uncorrupted element. Take the sunbeam wherever it descends —take that which at high noon has passed through the unguarded crevice into the depths of the stifling dungeon, or that which at early morn has glanced into the damp and decay of the chambered sepulchre, and you will find it the same ethereal and untainted sunbeam still—receive it there on a burnished surface, and it is reflected at the same angles; analyze it, and it carries in its bosom the same warm and luminous and chemical forces; pass it through a rarer or denser medium, and it is refracted according to the same rules; subject it to the action of a prism, and it is decomposed into the same colors, and these stand in the same order; in a word, it is the same in all respects.

The sunbeam is incorruptible. Let it descend upon whatever scene of disorder or corruption it may—let it shine and play amid whatever objects of impurity or vileness it may, and it continues as pure and ethereal as the moment it left the great fountain of light.

## TEACHINGS.

In all this we have a type of Christ, the Sun of Righteousness, as true as it is beautiful and significant. *Enter whatever company, associate with whatever grade of society, mingle with whatever class of sinners he might, he came forth from among them immaculate and untainted as he entered.* "He did no sin, neither was guile found in his mouth." To the end he continued "holy, harmless and undefiled."

This purity of character was maintained by our blessed Lord, not by *a separation from the world*, nor seclusion from human society, for such was not the case. He mingled freely with men of every rank and condition, wherever he went. At no time did he maintain the privacy of a recluse, or practise the austerities of an ascetic, or seek the solitude of a monk. He lived as a man among men; he ate and drank and dressed as other men. He even shared in their toils and fatigues, in their wants and trials, in their sufferings and sorrows. He joined in their social gatherings, in their worshipping assemblies, their marriage feasts and funeral processions. Unlike the heathen sages, he assumed no mysterious or sacred isolation; unlike the Stoic philosopher, he despised no grade of men; unlike the self-righteous Pharisee, he shunned no class of sinners. He feared no taint, and he felt no humiliation from converse or contact with any. As the Sun withholds his light from no scene or object in order to preserve its purity, but sheds it as freely on the miry pit as on the marble pavement, on the pestilential marsh as on the perfumed garden—so the Sun of Righteousness withheld not his presence from any class or community for fear of pollution, but mingled and conversed as familiarly with publicans and sinners as with the scribes and rulers. He entered the house of Zaccheus the publican

as readily as that of Simon the Pharisee, and accepted the silent tears of Mary of Magdala with no less cordiality than the loud hosannas of the triumphal multitude. He shunned no man because he was a sinner above others. He sought not to preserve his holiness unspotted by avoiding contact with the world; but ever stood ready to act the part of a friend toward the chief of sinners.

Nor are we to ascribe the Saviour's purity of character to *a special exemption from trials.* Far, indeed, was this from being his case; "he was tempted in all points like as we are." He was tempted of the devil, and he was tempted of men. The period of his ministry, from its beginning to its close, was a continued conflict with the powers of darkness and with the wickedness of the world. Because he was holy and denounced all evil, the workers of evil hated him, and opposed him, and conspired against him. The scribes frowned upon him; the Herodians laid snares for him; the Sadducees sought to perplex him; and the Pharisees resisted and reviled him. At every step he took, his malignant enemies were ready and waiting to dart upon him;—his actions they decried, his motives they misrepresented, his character they maligned, and his gracious purposes all they daily endeavored to defeat. He was proscribed by the rulers and execrated by the rabble. He was betrayed by one of his own disciples, denied by another, and deserted by all of them. He was arrested by a band of ruffians in the retirement of his devotions. He was mocked, and buffeted and spitten upon by a brutal soldiery. Truth was violated, justice was contemned, and religion was prostituted to secure his condemnation. And at last he was dastardly surrendered to the unrestrained cruelty and vengeance of his enemies, while his very judge was forced to cry

out amid their clamor, "I find no fault in him." Yet through all these unparalleled trials and sufferings, he continued "holy, harmless and undefiled." His wisdom and patience never failed him. His forbearance and love never forsook him. His purposes of grace toward man never faltered. His calmness and serenity were never disturbed. His holy consistency was never once marred by word or act. In the midst of hypocrites he remained faithful and true; in the midst of the selfish he continued generous; in the midst of the sensual he was ever pure; in the midst of the false and malicious and cruel he maintained his meekness, forbearance and love; and out of the midst of every scene of trial and corruption, he came forth pure and transparent as the sunbeam!

What a character was that of Jesus! What a life was that he lived! Among all the sons of men there is not one that may be compared with him. There never was a human being, however wise and good, who did not occasionally deviate more or less from the rule of his duty —who did not yield more or less to the pressure of circumstances, or allow himself to be carried away by passion or excitement—or who did not betray some native weakness, some faltering in the path of duty, some unbelief under affliction. But in Jesus Christ we find the same perfect and holy character at all times, in all places, and under all circumstances. "We behold him in every conceivable variety of position," says an eloquent writer, "mingling with all sorts of persons, and with all kinds of events; we follow the steps of his public life, and we watch his most unsuspecting and retired moments; we see him in the midst of thousands, or with his disciples, or with a single individual; we see him in the capital of his country, or in one of its remote villages, in the temple and the synagogue, or in

the desert, or in the streets; we see him with the rich and with the poor, the prosperous and the afflicted, the good and the bad, with his private friends and with his enemies and murderers; and we behold him at last in circumstances the most overwhelming which it is possible to conceive, deserted, betrayed, falsely accused, unrighteously condemned, nailed to a cross!—but wherever he is, and however placed, in the ordinary circumstances of his daily life, or at the last supper, or in Gethsemane, or in the judgment hall, or on Calvary, he is the same meek, pure, wise, godlike being." And at last, when his mission upon the earth was accomplished, he emerged from this region of guilt, ascended on high, and re-entered the portals of heaven, as pure and unspotted as when he left the bosom of the Father.

## ANALOGY IV.

*As the Sun of Nature finds in the body an organ, the eye, designed to receive and appreciate and employ its light,—so the Sun of Righteousness finds in the soul a faculty, the conscience, designed and qualified to receive his truth and to discern the right.*

### PHENOMENA.

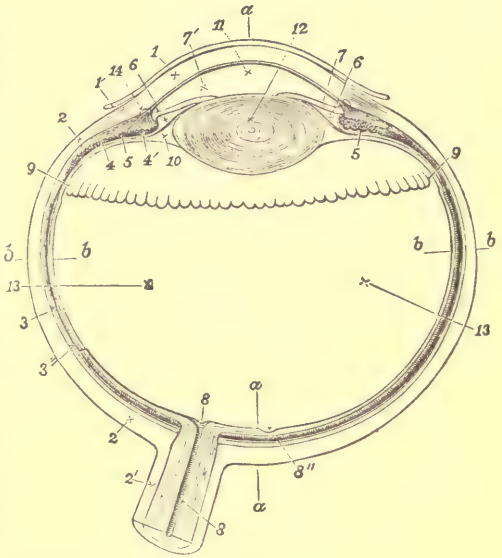
THE creature Man, the first of our race, awoke to consciousness in a world already formed and fashioned, and complete in all its arrangements. Its firmament had been established, its oceans had received their bounds, and its dry lands had been clothed with verdure and fruitfulness. Its seasons were pursuing their rounds, and day and night their pleasing alternation of light and darkness. Its rivers flowed, its winds blew, its lightnings played, and its showers descended, all in their appointed times and order. In a word, its parts and elements all had received their laws, and these were in full and universal

operation. And man, when called into being, received a constitution that was in all things adapted to these pre-existing cosmical arrangements—a constitution that was in harmony with these physical conditions in the midst of which he found himself placed. His strength was adapted to the gravitation of the globe upon which he was to dwell, his organization was fitted to derive its required nourishment from the fruits and food which it produced, his lungs were constructed to breathe the air which bathed and fanned its surface, his olfactories were nerved to distinguish its odors and to be regaled with its perfumes, his ears were attuned to receive through the undulations of the atmosphere their impressions of sound and their delight from the charms of music. In all these, and a hundred other particulars, we see that the world was adapted for the constitution of man, and man adapted for the constitution of the world.

But in no organ or function of the human frame are design and contrivance so strikingly observable as in the mutual adaptation of the *Eye* and *Light*. The human eye has been rightly called "the masterpiece of divine mechanism." The structure of this organ is exceedingly complicated, yet the adjustments of all its parts are inimitably perfect and beautiful. "There is that in the formation of the eye," says Herschel, "which is so similar and yet so infinitely superior to a product of human ingenuity—such thought, such care, such refinement, such advantages taken of the properties of natural agents used as mere instruments for accomplishing a given end, as force upon us a conviction of deliberate choice and premeditated design, more strongly perhaps, than any single contrivance to be found, whether in art or nature, and render its study an object of the greatest interest."*

* *Encyclopædia Metropolitana*, art. Light.

The evidences that the eye is the work of designing Intelligence are numerous and diversified. It is obviously constructed with a distinct reference to an element without itself, and an element the most ethereal and sublime in all nature—*light*. All its parts are formed and adjusted in harmony with the laws which are known to govern this marvellous element. The following figure,



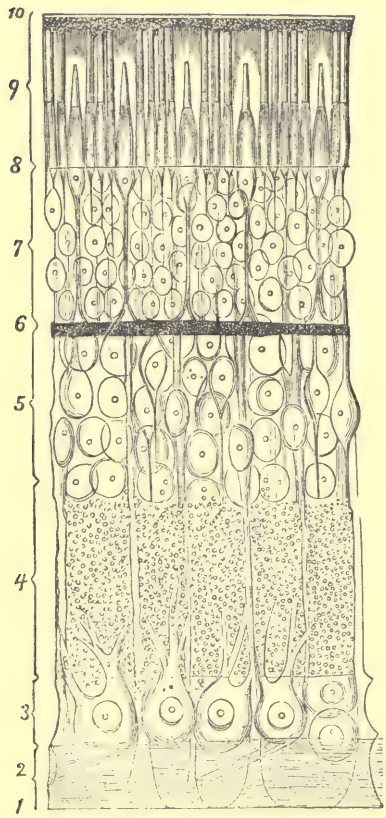

1, cornea; 1′, conjunctiva; 2, sclerotic; 2′, sheath of optic nerve; 3, choroid; 3″, rods and cones of the retina; 4, ciliary muscle; 4′, circular portion of ciliary muscle; 5, ciliary process; 6, posterior chamber between 7, the iris and the suspensory ligament; 7′, anterior chamber; 8, artery of retina in the centre of the optic nerve; 8′, centre of blind spot; 8″, macula lutea; 9, ora serrata (this is of course not seen in a section such as this, but is introduced to show its position); 10, space behind the suspensory ligament (canal of Petit); 12, crystalline lens; 13, vitreous humor; 14 marks the position of the ciliary ligament; *a*, optic axis (in the actual eye of which this is an exact copy, the yellow spot happened, curiously enough, not to be in the optic axis); *b*, line of equator of the eyeball.

SECTION OF THE HUMAN EYE.

borrowed from *Huxley's Physiology*, exhibits a very complete view of the structure of this complicated organ.

The form of the eye is that of an ellipsoid, just that shape, out of ten thousand possible shapes, which mathematicians have demonstrated to be the only one that can refract and bring together all the rays of light which proceed from a particular object to a single point, and thus form a distinct image of such an object on the surface where they meet.

The eye, as just stated, consists of a great number of distinct parts, differing in their material, differing in their forms, and differing in their offices, yet so related and so skilfully combined as to compose an optical instrument of exactness and efficiency which no human art can hope to approach, far less to attain.




SECTION OF THE RETINA.

1, Limitary membrane; 2, layer of nerve fibres; 3, layer of nerve cells; 4, granular layer; 5, inner granular layer; 6, intermediate granular layer; 7, outer granular layer; 8, fine membrane; 9, rods and cones; 10, the choroid. Light penetrates no farther.

To qualify it for its important function, the eye is encompassed with three membranes or coats; the outermost, or the *sclerotic*, is exceedingly firm and dense, and gives to it the mechanical support necessary for the preservation of its form; within this is another coat, the *choroid*, whose main office is to supply it with nourishment through its numerous veins, and by its black interior to absorb any scattered rays that might interfere with clear vision; within this again is spread a third, the *retina*, the only part of the whole nervous system susceptible of impression from luminous rays. The structure of the retina, though for the most part less than the one-hundredth part of an inch in thickness, is a marvel of complication; some idea of it may be

gained from the annexed figure, which represents a vertical section of it, as it appears under the microscope. This exceedingly thin and delicate layer of nervous matter is spread in the form of just such a concave, and just at such a distance behind the lenses, as are indispensable to distinct vision; any change, even the slightest, in the amount of this distance, or in the character of this curve, would infallibly result in defective sight.

The interior of the eye is occupied by three transparent media, called the *aqueous*, the *crystalline*, and the *vitreous humors;* these form so many lenses of different character, placed one behind the other, for the convergence of the rays of light, so as to meet and form pictures of external objects on the retina, which lines the hind two-thirds of the interior of the ball.

The lenses are formed of substances having different refractive powers, so as to prevent the light from being resolved into prismatic colors, and so give to objects a tinge which does not belong to them; for this purpose the crystalline lens is constructed of an infinite series of concentric layers, which increase in their density as they succeed one another from the surface to the centre; by this means an optical difficulty is overcome in a way quite inimitable to human art.

The perforation of the Iris, or the pupil, by which the light is admitted into the eye, is a very remarkable arrangement. The Iris is composed of two layers of contractile fibres; the one forming concentric circles; the other disposed like radii between the outer and inner margin; when the former act, the pupil is contracted; when the latter act, the breadth of the Iris is diminished, and the pupil is, of course, dilated. By this refinement of ingenuity, acting spontaneously, the quantity of light

admitted into the interior of the eye is regulated, so as ever to be adapted in its degree of intensity to the extreme sensibility of the retina.—What structure can be more artificial, or what machinery can be more exquisite in its operation, than this!

The eye is furnished with a most delicate yet most efficient system of pulleys and ligaments, that, without conscious effort and without a moment's delay, alter its convexity and relative position of parts, so as to adapt it to perceive objects at different distances—an operation slowly and with some difficulty effected by man in his telescope by lengthening or shortening its tube.

The eye is also supplied with a complete system of muscles, six in number, by which it can be rapidly turned at will in any direction, so as to change or vary the field of vision, as necessity, pleasure, or fancy may dictate. Four of these act by direct contraction, turning the eye up or down, to the right or the left; the other two serve to give it an oblique direction—one of these is remarkable for the artificial manner in which its tendon passes through a cartilaginous pulley in the margin of the orbit, and then turns back again to be inserted into the eyeball to give it a degree of rotation on its axis; in no other way could the tendon pull in the required direction.

In the hollow of the orbit, above the eye, is planted the lachrymal gland, a self-acting fountain of tears, which gently spread and flow over its pellucid surface, to lubricate its motions and to wash away any particle of dust, or other irritating substance that may happen to be introduced.

Each eye is likewise furnished with a well-contrived conduit to carry off the superfluous moisture into the nostril, to be evaporated with the warm breath.

Each eye, moreover, is provided with lids, like curtains, to close over it in sleep, to wipe it, to cut off the outer rays of light that would confuse vision, and to protect it against blows, or dust, or any other means of injury; and the rapidity with which these lids open and close is past all admiration.

Even the position assigned to the eye is worthy of special remark; wisdom could not have chosen a better. It is planted in the most elevated part of our frame, so as to command the most extensive and the least obstructed prospect. It is placed in front, so as most readily to apprise us of whatever may lie in the direction we may proceed, as well as to preside over the movements of our feet and the manifold operations of our hands. It is sunk in a deep bony socket, where it is comparatively safe from external injuries; and here it is imbedded in a soft cushion of fat, which, of all animal substances, is the best adapted both for its repose and motion; and thus its delicate structure is not hurt by the bony walls around it, as it rests on them, or as it turns swiftly hither and thither at the bidding of the will.

Such, in brief, is the eye of man—an organ scarce an inch in diameter, yet embracing all these wonderful parts, these marvels of optical laws, these profound principles of mathematics, these contrivances of inimitable skill—an organ whose exquisite powers can perceive alike objects that are near and those that are afar off, can take cognizance of the minutest particles and of the mightiest globes of matter, and can appreciate motions that are slow as the lengthening shadows, or those swift as the descending sunbeams. What a demonstration do all these parts and powers and adaptations offer that this organ can be none other than the contrivance of Divine Wisdom, and the work of the Divine Hand!

To man the eye is an organ of incalculable value; his comfort, his health and his life depend upon its offices; daily and hourly it ministers to his welfare in a thousand different ways. It is the guide of his feet, and the director of his hands. By it he discerns what is harmless from what is hurtful, what is good from what is bad. By it he is apprised of the precipice or pitfall that lies in his way, and is guided to pursue a safe path. By it he is enabled to recognize his friend at his side, and to descry his enemy at a distance. By its light he is enabled to accomplish the handy work of daily life, to practise the ingenuities of art, and to achieve the wonders of science. Of all the avenues through which knowledge finds entrance to the soul, the organ of vision is the most affluent in its contributions. All our ideas of form and color, of symmetry and beauty, come to us through the pupil of the eye; yea, through this narrow portal we gain all our impressions of the charms of the landscape, the vastness of the earth, and the glory of the heavens. Close this little aperture, and the grandeur of creation would be displayed in vain—all would be a blank. Shut up this diminutive window, and the sun himself would shine in vain, for beneath all its splendors man would be the hapless tenant of absolute darkness, and would have to grope his way through the world as cheerless as the mole that has its ways and its habitation beneath the sods of the field. Who then can fail to be unceasingly thankful for the sight of his eyes!

### Teachings.

Admirable in its structure and important in its office as this organ implanted in the body is, it is not more so than another organ, or rather *faculty*, that is implanted in the mind, namely, the Conscience. Conscience, in an

interesting sense, is the soul's organ of vision. What the eye is to the body, that conscience is to the soul. By the sight of the eye our feet are guided in the path of safety, and by the direction of conscience our minds are guided in the path of rectitude; the former derives its illumination from the Sun of nature, the latter from the Sun of Righteousness.

Now conscience is our *moral sense*, or that capacity of our mental constitution by which we feel the difference between right and wrong; and its office is to direct the exercise of all our powers, affections and propensities according to the will of God; in other words, to prescribe what we should do and not do, what we should be and not be. And when its voice is heeded and its dictates obeyed, it bestows, as in reward, a happy sense of self-approbation; but when its commands are violated, it arouses within the mind the painful feeling of self-condemnation.

Conscience, like the eye, is devoted to *one office exclusively*. The eye is designed and constituted simply to receive impressions from light—that which comes to it directly or by reflection from any particular object, and thereby to announce its shade or color. To such an object may belong many other properties; it may be hard, or heavy, or bitter, or fragrant; but the eye says nothing, can say nothing about these; its function relates solely to light. So conscience; this faculty deals only with the moral qualities ot actions. A particular action may be viewed in various other lights; it may be regarded as clever, or foolish, or seasonable, or polite, or uncivil; but conscience takes no notice of such characteristics; it is concerned only with the right or wrong of it. And in pronouncing its sentence, it takes no account of incentives or consequences; makes no inquiry concerning the profit

or pleasure, applause or shame, that may result from it. Its simple and uncompromising utterance is—This is right, do it; or, This is wrong, do it not, whatever may follow.

The conscience exercises its authority over *the whole man:* over all the movements of his body and mind—his actions, his words, his plans, his desires, his motives, and even his emotions so far as the will consents to them. The eye of conscience perpetually ranges through all the interior activities of the soul; nothing escapes its notice, nor does it behold a move that it regards with indifference. Its supervision is universal and unremitting; even our sleeping hours are not exempt from its jurisdiction; so keen is its eye, and so delicate are its balances, that it condemns even the sinful dream, as it does the sinful thought.

The decisions of conscience, like those of the eye, are *instantaneous.* As the eye at once acquaints us with the color and shape, proximity or distance of the object to which it is directed, so conscience pronounces instantly upon the right or wrong of an action or course of conduct. And this promptness of decision is of vital importance in both. The eye has been constituted to inform us by the direct and quick method of sensation of what is safe or perilous, baneful or beneficial to our bodies. If when any exterior object approached us we were always obliged to calculate its magnitude and determine its configuration, or to judge by the laws of motion and gravitation and reaction whether its approach would be injurious or harmless to us, our frail systems, in a multitude of circumstances, would be crushed and destroyed before we could finish our calculation or estimate. Or, if it were always necessary before we took any nourishment to analyse the aliments before us, to determine their proper-

ties and effects, we should die with hunger before we had finished our examination. But God has so constituted our sense of vision as to dispense with such tedious discussions, and to give us at once the needed information. And so it is with conscience. If the morality or immorality of an action could be determined only by consulting casuists, or the authority of books, or systems of political economy, where would we land, or what would become of us? In numberless cases, we are called upon to act on the instant, and information gathered by such slow processes would come too late. But the Creator has so endowed the faculty of conscience as to give its decision without a moment's delay; we have its approval or disapproval, in such cases, with the quickness of thought. No sooner does the temptation to utter or commit a wrong present itself than conscience flashes through the mind its condemnation of it; and no sooner does the call to perform a virtuous or benevolent deed sound in our ears than it diffuses the sweet feeling of its approbation through all the sensibilities of the heart.

The faculty of conscience, like the organ of vision, however, judges and pronounces *according to the degree of light it has.* If an object stands in full and clear light, the information of the eye respecting it is correct and reliable; but if the light that falls upon it be dim or partial, the eye may err both as to its true color and real shape. So it is with conscience, or the moral vision; acting beneath the pure and perfect light of the Sun of Righteousness, its decisions are ever according to truth and right; but if destitute of this light, its decisions may be more or less erroneous, or even be altogether wrong. This, however, argues no natural imperfection in the faculty itself. A judge can pronounce sentence only according to the evidence set before him; if that evidence

be false or defective, though he be the most righteous of men, he may come to a very unjust conclusion; to secure an equitable sentence from his lips, the facts of the case must be fully and faithfully set before him. And this is equally true of conscience; let it have the pure light of the Divine Law, and its decisions will be infallibly on the side of rectitude. It follows, therefore, that it is no less our duty to *enlighten* conscience than to obey its dictates. "No man is at liberty to say, in regard to any given case, 'I am willing to refer this matter to conscience, and to abide by its decision,' without first taking the pains to lay the case fully and fairly before conscience, the power that is to sit in judgment upon it. We might as well expect the judge in a court of civil justice to give an upright decision without facts, without evidence and without law, as to expect a correct decision from this spiritual judge, that exercises authority in the judgment-seat of the soul, without a full and fair presentment of the facts by the Intellect. And when we say it is necessary to make a full statement of the facts, we may add, that they are to be stated not only in themselves, but also in their relations and bearings upon each other. This is one form of moral training or moral education."*

As the eye is an organ, so conscience is a faculty, *common to the human race.* This moral sense is an essential part of man's mental constitution. It is so inseparable a part of him that it constantly acts as a mere instinct, and approves or condemns his conduct spontaneously, as his palate distinguishes between sweet and bitter. In a more or less vigorous condition, it lives and acts in the breasts of all men. It may be resisted, it may be weakened, it may be silenced, but it cannot be extinguished. Even in the darkest regions of the earth and among the rudest

* Upham's *Mental Philosophy*, p. 422.

tribes of men, it recognizes, up to the measure of its light, a distinction between right and wrong, between truth and falsehood, between justice and injustice. Man, without conscience, would be in as pitiable a condition morally, as he would be without the eye physically; and the wisdom and benevolence of the Creator in the bestowment of the former are not less conspicuous than in the formation of the latter.

The moral sense is *a principle essential to all religion.* If men were not endowed with conscience they would be altogether incapable of religion, and could profit nothing by divine revelation. For, in vain were their duty prescribed by the Scriptures, in vain were allegiance required of them towards their Creator, and in vain were love and gratitude enjoined upon them towards their Redeemer, if there was no principle in them previously which made them feel the obligations of duty, of allegiance and of love. They could have no ideas, no sentiments, corresponding to such terms; nor any conviction that, independently of fear or interest, they were bound to regard either him who made them, or him who redeemed them. Conscience, therefore, is a principle fundamental to all religion. As the Sun of nature would arise and shine in vain for man if he had not been furnished with the eye to perceive its light, so the Sun of Righteousness would have risen in vain upon the world of mankind if they had not been endowed with conscience to feel and respond to the light of truth which he sheds down upon them.

Conscience is a witness for *the existence and presence of God.* The felt presence of this judge of good and evil in the breast perpetually speaks to us of the presence of him who is Supreme Judge over all. It asserts the unremitting inspection of his omniscient eye with a power which

no argument can parry, and with a distinctness which no sophistry of lust or passion can obscure or suppress. With its still small voice it maintains and perpetuates amid all the storms and turbulence of life this testimony, "Thou God seest me."

Again: conscience, by its uncompromising condemnation of what is wrong and approval of what is right, is a living witness for *the righteousness of God*, and of his requirements. If God had been an unrighteous Being himself, he never would have implanted such a faculty in the human mind—never would have given to it so distinct and authoritative a voice on the side of righteousness. He never would have constituted our species with this living testimony against Himself in every breast. No: the uniform and decisive voice of conscience for right and against all wrong is a decisive evidence for the righteousness of the Divine Character, and an evidence, too, that keeps its ground amid all the disorders and corruptions to which humanity is liable. And, as the existence of a regulator in a watch, however poor a timekeeper it may have become, shows plainly that the design of its maker was that the revolutions of its hands should keep in harmony with the daily revolutions of the Sun; so conscience shows with equal plainness that the design of man's Maker is, that in all his movements he should harmonize with the law of truth and rectitude. By making conscience a part of our nature, as the regulator is a part of the watch, arming it with authority over every other part and power, by enlisting all that authority on the side of righteousness, and by accompanying its voice with sanctions for the enforcement of its dictates, God has inscribed on the tablet of every heart a demonstration of the holiness of his character and of the justice of his law.

Once more: conscience gives assurance of *a judgment to come.* While it pronounces the transgressor guilty, it never fails to beget in him a sense of merited punishment. It makes the criminal feel, not only that he is blamable, but justly punishable for his wrong-doing. And this "sense of deserved punishment," says a discriminating writer, "is never separated from the dread that, at some time or other, punishment shall be actually inflicted. This dread is not confined to the vengeance of man. For let the sinner's evil deeds be ever so thoroughly concealed from the knowledge of the world, his inward alarms are not quieted by that consideration. Now punishment is the sanction of a law. Every law supposes a rightful superior; and therefore, when conscience threatens punishment to secret crimes, it manifestly recognizes a Supreme Governor, from whom nothing is hidden. The belief of our being accountable to him is what the most hardened wickedness has never been able to eradicate. It is a belief which arises, not merely from reasoning, but from internal sentiment. Conscience is felt to act as the delegate of an invisible Ruler; both anticipating his sentence, and foreboding its execution." In this way this faculty foretells and assures every living man that he must appear before the judgment-seat of God.

We see hence how essential the office of this faculty is to all religion. Conscience, which bears its earnest testimony to all these solemn truths, like a motive force, has its place deep in the mind, even at the centre of our intellectual and emotional nature, and is powerful to decide the Will and to arouse and direct the Affections, and consequently is powerful to mould the whole life. And it is only by bringing the light and energy of truth to bear upon this moral agent within that we have hope to reclaim, reform and save men from their sins.

It was by pouring his illuminating and quickening beams into this, the eye of the soul, that the Sun of Righteousness ever sought to convince men of the error of their ways, to inspire them with nobler motives, and to raise them to newness of life. And it is both interesting and profitable to notice the diverse workings of conscience under his divine instructions and tender appeals: —how it aroused to fixed attention the most heedless and grovelling; how it alarmed those that lived at ease; how it suffused with shame the cheek of the hypocritical; how it moved and melted publicans and sinners; how it compelled the self-righteous to lay hold of the arrows of truth and press them into their own breasts; how it rebuked the unfaithful and condemned and scourged the traitorous.

See conscience in exercise in that poor, stained, fallen woman, Mary of Magdala! She hath seen Jesus—she hath heard his gracious words, and conscience hath carried them home to her very soul. And what a change they have wrought there! She longs to be near the Holy Teacher; and soon we see her, with her box of precious ointment, pressing her way toward him at Simon's feast. In the sacred presence, the faithful monitor within contrasts her own shameful and degraded life with his sinless purity and holy love—her heart is melted—she begins to weep—her tears drop fast and hot upon his unsandalled feet, over which she bends lower and lower —with her long dishevelled hair she wipes them, and in very love begins to kiss them, and then bathes them with the costly and fragrant nard. Such are the kindly workings of conscience under the influence of divine truth and grace.

Mark again the power of this moral faculty over those malicious Scribes and Pharisees, who drag a surprised

S. J. Ferris, del.

"AND SHE BEGAN TO WASH HIS FEET WITH TEARS, AND DID WIPE THEM WITH THE HAIRS OF HER HEAD."

transgressor into the temple, and, with brutal indifference to her agony, setting her in the midst, demand of the Saviour whether she should not forthwith be stoned for her offence. The answer of the Merciful One is brief: "He that is without sin among you, let him cast the first stone." It is enough. As with a thunder peal it reverberates through all the dark recesses of their souls the startling words, *Thou that judgest another condemnest thyself, for doest thou not the same thing?* In a moment, their insolent and perfidious countenances drop guiltily to the ground—they are whelmed with shame. "And being convicted by their own CONSCIENCE, they went out one by one, beginning at the eldest, even unto the last; and Jesus was left alone, and the woman standing in the midst."

Witness again this inward monitor as it rebukes and recovers the sincere but impetuous Peter. Notwithstanding the faithful warning given him, Peter denied his Master, and that with the aggravation of profanity. "And the Lord turned and looked upon Peter." That look—oh, like an arrow it shot the anguish of its rebuke into his inmost soul; and prostrate conscience, seizing the moment, leaped to her throne again, and again swayed her sceptre with a power and authority that allowed him to heed no more aught beside—"he saw no more enemies, knew no more danger, feared no more death." Rushing for the door and the darkness of night, *Peter went out and wept bitterly!*

Behold, once more, the terrible power of this vicegerent of God in the soul as displayed in the case of unhappy Judas. Having profaned his sacred cheek with the villanous token, the injured Master calmly said, *Judas, betrayest thou the Son of Man with a kiss?* That one word—it rouses and recovers his stupefied conscience,

which, in a moment, lights up his dark soul with a sudden and woful glare to see the baseness and hideousness of his crime. Wretched traitor! with feelings that the very devils might pity, he slinks back into the gloom, and finds himself alone with his tormentor. We see no more of him till we hear him shriek in the temple, "I have sinned, in that I have betrayed innocent blood." Driven now by remorse into despair, and by despair into madness, he wildly flings the pieces of silver on the sacred pavement, and goes out and hangs himself!

Thus, as the Sun of nature finds in the body an organ, the eye, designed to receive and appreciate and employ its light,—so the Sun of Righteousness finds in the soul a faculty, the conscience, designed and qualified to receive his truth, and to discern the right. And happy the man who hears and heeds her still small voice; for all her ways are ways of pleasantness, and all her paths are peace. When we silence or neglect the voice of this monitor, we silence and neglect our best counsellor, and expose ourselves to the inevitable peril of proceeding from one error to another, and from one sin to a second, till we end our career in a gulf of wretchedness.

## ANALOGY V.

*As the Sun of Nature conveys its light to the eye through the all pervading ether,—so the Sun of Righteousness imparts his light to the soul through his Omnipresent Spirit.*

### Phenomena.

Light, the first production of Creative Power, has ever been a subject of profound interest to reflecting minds. From very early times we find men busy with attempts

to render some account of it. The ancient philosophers, though often bewildered in their reasonings concerning it by their metaphysical subtleties, could plainly see that light was an element of the utmost importance to all nature. They made but little progress, however, in its study beyond a few simple and obvious facts. What light was, or how light was produced, were questions to which they could return no satisfactory answers.

The alchemists of the Middle Ages regarded the luminous principle as a most subtle fluid, capable of interpenetrating and mingling with gross matter; gold they conceived differed from the baser metals only in containing a larger quantity of this ethereal element; and in the transmutation of the latter into the former the solar light was supposed to be marvellously efficacious. But minds taken up with such idle fancies were little qualified to investigate the real facts and phenomena of nature.

About the year 1100, an Arabian, named Alhazen, began a rational and to some extent successful inquiry concerning the laws which govern the reflection and refraction of light. At later dates the same course of inquiry was taken up successively by Roger Bacon, Vitellio, Kepler and others. But it was not until the close of the seventeenth century that anything like a scientific account of this wondrous element was given to the world, when Newton put forth what has been called the *Emission Theory* of light. This great philosopher conceived that light consists of elastic particles of inconceivable minuteness shot forth in all directions with inconceivable swiftness from the globe of the Sun, or other luminous bodies; and that these, entering the eye in a continuous flood, produced therein the impression of light. But this theory, beautiful as it was, and serving to give a satisfactory account of so many of the phenomena of light as

it did, was not adequate to account for all, and thus was beset ere long by many and serious objections.

Huyghens, a contemporary of Newton, and a man of distinguished intellectual powers, finding great difficulty in conceiving this incessant cannonade of particles, and in realizing that they could shoot with such inconceivable velocity through space, and yet not disturb each other, sought for some other theory of explanation that would be more satisfactory. The manner in which sound is produced, and conveyed to the ear, led him step by step to the conception that light, possibly, was produced and conveyed by similar means and in a similar way, namely by *vibrations*. Upon this conception he labored until it matured into what has been known ever since as the *Undulatory Theory*. This theory soon found supporters, among the most distinguished of whom was Euler. But to Dr. Thomas Young, Professor of Natural Philosophy in the Royal Institute of Great Britain, belongs the immortal honor of establishing this theory on a safe and enduring basis. The claims of the Undulatory Theory were strenuously contested for a long time by the adherents of that of Newton; every point and principle was thoroughly sifted and discussed; but before ever increasing evidence brought to light by Fresnel and others in its favor, all objections had to give way; and now the theory of Undulation is universally accepted as the true one. A few words will suffice to state and explain its general principles.

If a pebble be dropped into the bosom of a smooth sheet of water, it will generate a succession of circular waves, extending wider and wider, till they strike against the surrounding bank. In these waves there is no actual motion of the water; they are only *advancing forms;* this is readily proved by throwing upon the surface a few

light chips; these will not be carried forward with the waves, as they certainly would be if the water was actually in motion; they will simply rise and sink at the same spot. The waves produced by the pebble are like the waves seen to sweep over a field of growing wheat, where not a straw forsakes its place.

Similar waves, though invisible, are created in the atmosphere when a bell is struck, or the chords of a piano are touched, or a word is uttered. These aerial waves or vibrations, like those in the water, extend in all directions, vertically as well as laterally; and when in their outward progress they strike upon the drum of the ear they produce a corresponding vibration in that, which by a chain of marvellous contrivances is conducted to the brain, and there awaken the sense or impression of *sound*. The length and frequency of these vibrations determine the pitch of the sound; rapid vibrations give a high note, slower vibrations a lower note. Thus sound has the *air* for its medium; where there is no air there can be no sound.

Now, light is produced and transmitted in a similar manner, namely, by vibrations or undulations, not in the atmosphere which extends but a few miles from the earth's surface, but in a medium of its own, called the *Luminiferous Ether*. This medium is among the most marvellous and incomprehensible elements in nature, yet an element whose existence and agency are now well established. "Close examination of the phenomena of light, by the most refined and demonstrative experiments," says Tyndall, "has led philosophers to the conclusion that space is occupied by a substance almost infinitely elastic." It is, moreover, infinitely extended; it fills all space, even the most distant regions of the stars and nebulæ. The visible creation is afloat in it, and

permeated by it. It connects and constitutes all the globes and all the matter which make up the universe into one related whole. It is a bond of union, and a medium of interaction and intercommunication between its most distant members. Nor is this all, this subtle substance penetrates all material bodies, even the hardest and most compact; it surrounds the very atoms of all solids and liquids. Its presence is excluded from no place, no substance.

Now, heat being "a mode of motion," and the Sun being an intensely heated globe, its atoms are in perpetual vibration, and this vibration creates a corresponding motion, or minute waves, in the luminiferous ether which enwraps its whole sphere; and these waves, travelling outward in all directions with inconceivable velocity, presently reach the earth, and entering the pupil of the eye, pass through its lenses, and impinge upon the retina; and the motion which the retina thus receives is transmitted along the optic nerve to the brain, "where it announces itself to consciousness as *light*." In the same way every visible star, and every luminous body, excites waves in the luminiferous ether, and produces its impression of light in the brain. And bodies that are not heated or luminous become visible by reflecting to the eye the ether waves that fall upon them.

Let not the reader who may be unfamiliar with such scientific subjects regard this explanation of light as a mere creation of the imagination; for every step in it is founded on demonstrated fact. The ethereal waves are as real as those upon the surface of the water, and their impingement upon the retina is as truly mechanical as the stroke of the water-waves upon the shore. Though these ether waves have never been seen by human eyes, yet their length and rapidity have been calculated with reliable

exactness. Their existence is proved by their effects, and from their effects their lengths have been deduced. This, we may add, has been done in many ways, and when the results of the different methods have been compared, they have been found to agree to the strictest nicety.

The science of light has gone further, and proved that, as the pitch of sound is determined by the length and frequency of the aerial waves, so our sense or impression of light is produced by the differing length and rapidity of the ether waves. The white light of the Sun, as stated in a previous chapter (Part II., An. II.), is a compound of every possible shade of color. If an object reflects or sends back the sunlight unchanged in its rate of vibration it appears *white;* but if the surface of that object has the property of altering the vibration into longer or shorter waves, the result will be that it will appear of a color corresponding to that rate—it may be *violet*, or *red*, or *blue;* or, if it is endowed with the property of annihilating the vibration, the result will be *blackness.* "The shortest waves of the visible spectrum are those of the extreme violet; the longest, those of the extreme red; while the other colors are of intermediate pitch or wave-length. The length of a wave of the extreme red is such, that it would require 36,918 of them placed end to end to cover one inch; while 64,631 of the extreme violet waves would be required to span the same distance.

"Now, the velocity of light, in round numbers, is 190,000 miles per second. Reducing this to inches, and multiplying the number thus found by 36,918, we obtain the number of waves of the extreme red in 190,000 miles. *All these waves enter the eye, and hit the retina at the back of the eye in one second.* The number of shocks

per second necessary to the production of the impression of red is, therefore, four hundred and fifty-one millions of millions! In a similar manner, it may be found that the number of shocks corresponding to the impression of violet is seven hundred and eighty-nine millions of millions. All space is filled with matter oscillating at such rates. From every star waves of these dimensions move with the velocity of light like spherical shells outwards." *

Such is the marvellous system of means through which we derive the pleasure and inestimable advantages of light. Let us pause for a moment and reflect upon it. There is the Sun, far distant in the heavens, a globe of stupendous magnitude, whose atoms all are kept in perpetual vibration by its intense and glowing heat. Encompassing it on every side, and pervading all space, is the infinitely elastic ether, adapted to receive and transmit these vibrations with the swiftness of lightning over distances that can be measured only by millions on millions of miles. And here is man on the earth, furnished with the eye, an optical instrument most admirably constructed and adapted to receive and collect these swift-winged waves of ether, at any moment he may wish to employ it. And behind this, again, is the brain, a nervous organ, qualified in a manner surpassing all thought and investigation to distinguish the multitudinous impressions conveyed to it, and announce to the indwelling mind the form and color of the objects from which they all proceed. Who can contemplate all this and not feel himself impelled to ask, whence these connections and adaptations of things in the heavens and things in the earth? Whence this marvellous relation and fitness of the solar globe to the viewless ether?

* Tyndall's *Lectures on Light*, p. 54.

Whence this wealth of contrivances in the eye, and this inscrutable sensibility in the brain? And all that we might be enabled to discern the things that pertain to our welfare, to see the landscape robed in the splendor of colors, and to behold the heavens garnished with their thousand worlds of glory. Whence?—whence but from a Being of infinite power and wisdom and love? "O Lord God, thou art wonderful in counsel, and excellent in working! Thou doest great things past finding out; yea, and wonders without number."

## Teachings.

If the arrangement of means by which the Sun of nature conveys its light to the outward man is thus worthy of our admiration and praise, much more the Divine Scheme through which the Sun of Righteousness imparts his light to the inward man. What the luminiferous ether is in the system of nature, that the Holy Spirit is in the system of the grace of God, but in an infinitely higher and more important sense. The Holy Spirit is the *Sacred Medium* through whom we receive all spiritual light. Man in his natural state is in darkness, is, indeed, blind. He seeth not, understandeth not, receiveth not the truth of God; spiritual things being spiritually discerned. The things of God knoweth no man but by the Spirit of God. It is the Spirit that giveth light, and it is the Spirit that giveth life. It is the Spirit that effectually teaches us all things pertaining to life and godliness; not by a new or special revelation, but by illuminating the eyes of our understanding to apprehend the one revelation given to all. It is the Spirit that gives the light whereby men are convinced of sin, of righteousness, and of judgment. It is the Spirit that reveals God in Christ reconciling the world unto himself. In a word, the

Holy Spirit is the Sacred Medium through whom all spiritual illumination and all gracious influences come to man.

Now, of the office of the Spirit in the system of grace, of his agency in enlightening, quickening and sanctifying men, the whole compass of creation affords no more apt, or instructive, or beautiful illustration than the *luminiferous ether*.

The luminiferous ether aptly typifies the *Omnipresence* of the Holy Spirit. This ether, as we have just stated, is all-pervading, occupying all space, penetrating all bodies, and embracing all the atoms of matter that make up the universe. Man finds himself surrounded and embraced by it whithersoever he goes. Let him in the dead of night, or in the depths of a cave, but ignite a match or strike a spark, and instantly it manifests its presence by vibrating their light in every direction. In short, he cannot go where it is not. So the Holy Spirit is everywhere present—filling immensity, present throughout the world, omniscient and active in every place, and near to man wherever he may dwell, whether amid Greenland's icy mountains, or on India's coral strand; whether in the crowded city, or in the lonely desert, or afar off upon the sea. He attends the footsteps of the exile in his banishment, and abides with the prisoner in his dungeon. He sees the tear of sorrow as it falls in secret, and hears the whisper of devotion as it rises in the soul. O divine and holy Spirit! "thou knowest my downsitting and mine uprising, thou understandest my thought afar off. Thou compassest my path and my lying down, and art acquainted with all my ways." Nor can I escape thy notice if I would; for "whither shall I go from thy Spirit? or whither shall I flee from thy presence? If I ascend up into heaven, thou art there: if I make

my bed in hell, behold thou art there. If I take the wings of the morning, and dwell in the uttermost parts of the sea, even there shall thy hand lead me, and thy right hand shall hold me. If I say, surely the darkness shall cover me; even the night shall be light about me. Yea, the darkness hideth not from thee; but the night shineth as the day: the darkness and the light are both alike to thee."

As the Sun had been created in vain had there been no luminiferous ether to transmit its light and heat to the earth, so *Christ had taught and suffered and died in vain but for the agency of the Holy Spirit applying the great salvation.* But for the ether, our world would have been a dark and cold and lifeless waste. The Sun might have been formed and poised in the heavens, and be all that it now is, a globe of magnificent dimensions and fervent heat; and the eye of man might have been all that it now is, a perfect optical instrument connected with a perfectly sound brain; yet, if there had been no ether medium to transmit the Sun's vibrations to the eye, we should have been in darkness as profound and unrelieved as if neither Sun nor eye had an existence. It is the invisible and elastic ether that conveys to us all the benefits that we derive from the great solar orb. And so it is the Holy Spirit that conveys to us all the benefits that we receive and enjoy from the Sun of Righteousness. Without the Spirit's agency we should be nothing profited by his redeeming work, all perfect and complete as it is. The Son of God might have assumed our nature, and might have done all he accomplished; he might have delivered all the lessons of his gospel for our instruction, and manifested all the love and compassion that he displayed, and have undergone all the agonies of the garden and the death of the cross; and man might have been

a guilty and condemned sinner as he is, and thus be in perishing need of the salvation thus wrought out;—yet, if the Holy Spirit did not exercise his gracious ministry, and apply the truth and the blood of atonement to the souls of men, all would have availed nothing, and Christ had died in vain. Men in their darkness would have seen no form or comeliness in the Saviour that they should desire him; yea, in their love of the world, and under the dominion of their lusts, they would have despised and rejected him, and turned from him with cool and callous indifference.

Such are men become through the corruption that is in them, through the blinding and hardening influence of sin, that, apart from the gracious influences of the Spirit, nothing in the divine teaching or holy example of Christ, nothing in the tender pity or unparalleled love he displayed for them, nothing in the mortal agonies or the dreadful death he endured on their behalf, will move or persuade them to come to him that they may be saved. "Their hearts are so hard, their minds are so blind, that the Saviour might have prolonged his groans to the end of time, and the rocks—the hard rocks of Jerusalem, might have burst, and the firm granite of the everlasting hills been dashed to powder, but still the sinner's heart would have been unmoved by all his groans; and the race would have been giddy in pleasure, and immersed in business, and grasping for honor unmoved. And, had the darkness of that unnatural night when he died, been prolonged to the present time; and had it been still whispered in every breeze, and heard in every echo, that the Son of God was *yet* suffering for men, and crying in the bitterness of a dying soul, *My God! my God! why hast thou forsaken me?* still not one solitary human heart would, of itself, care that there was no sorrow like to his sorrow.

From this scene the world would turn in cool contempt. They would reject the plan. They would not come to Christ that they might have life."*

It is through the agency of the Holy Spirit, and through this alone, that man becomes personally interested in the great salvation. It is the Spirit that reveals to him his danger and his need of the Saviour. It is the Spirit that by his secret and silent influence softens his heart into penitence and draws him to that Saviour. It is the Spirit that regenerates and sanctifies his soul; that guides and comforts him, that upholds and strengthens him, and enables him to continue faithful unto the end. In a word, the Holy Spirit is the *divine medium* that conveys into his heart all the benefits and blessings of the Sun of Righteousness.

Admirable and abundant as are the arrangements of nature to illuminate the whole world, yet it is *optional* with every individual whether he will admit or exclude the light. The Sun may glow and vibrate in all his strength, and the ether may convey swiftly down its warm and luminous pulsations, but it is left to his own will and pleasure to decide whether he will open his eyes and receive the light, or close his lids and remain in darkness. So it is in regard to the light that comes from the Sun of Righteousness—spiritual light. It is a matter of *choice* with every man whether he will open his mind and heart to admit this light, or close them and reject it. As the ether waves will not batter through or pierce their way into the closed eye, so neither will the Holy Spirit of Light force a passage into the unwilling soul. But, "if any man will open the door, he will come in." The Spirit may be resisted, may be grieved, may be quenched. He may be shut out of the heart as effectu-

* Rev. Albert Barnes, in sermon, *The Way of Salvation.*

ally as light from the eye. And, sad to state, multitudes there are who do this. Hence the Saviour's complaint—"This people's heart is waxed gross, and their ears dull of hearing, and *their eyes they have closed*, lest at any time they should see with their eyes, and hear with their ears, and understand with their heart, and should be converted, and I should heal them." Religion from first to last, is a matter of choice. This is the doctrine of nature, and it is the doctrine of the Bible—"choose ye this day whom ye will serve." It is moreover the doctrine of experience; for every one that walks in the path of light is conscious, and is ready to testify, that he does so freely and by choice; and every one that walks in the dark road is just as voluntary in the course he is pursuing, and if ever he forsake it, it will be because he will choose to do so. There is indeed truth, yes, and glory, too, in the doctrine of the Spirit's influence, but that does not interfere at all with man's freedom; it leaves him with the full power of choice, and with all the responsibility of a moral agent.

There is much that is to us inexplicable and mysterious connected with both the agency of the luminiferous medium and with the operations of the Holy Spirit; but *these mysteries offer no just reason for disbelieving and rejecting either the one or the other.* Yet men there are who, claiming superior discernment, proudly and summarily discard the doctrine of the Spirit's agency in enlightening and renewing the soul, because it involves what is to them incomprehensible, or mysterious. If the existence of mystery offered sufficient grounds for rejecting any doctrine of nature or of grace, our creed would be quickly reduced within very narrow limits indeed; for what is there that has not its mysteries? An insect's wing, a blade of grass, a drop of water, or a grain of sand em-

S. J. Ferris, del. "AND SUDDENLY THERE SHINED ROUND ABOUT HIM A LIGHT FROM HEAVEN, AND HE FELL TO THE EARTH."

braces mysteries which have baffled the proudest efforts of human intellect to explain. The very nature and existence of the luminiferous ether are mysteries; it is a mystery how it can transmit its waves with such inconceivable swiftness; it is a mystery how difference in the length of these waves can produce the impression of different colors; it is a mystery how the vibrations produced by these waves in the material organ of the brain can awaken the sense of *light* in the immaterial mind;—yet all these mysteries together offer no valid ground to doubt its existence or its undulations, for both are proved by their effects. The same holds true of the operations of the Spirit. The manner in which this Divine Agent influences the human soul is, indeed, a great mystery. How he can change the whole bent and disposition of the mind, and not interfere with the freedom of the will, is what we are not able to explain or understand; but he does so as certainly as the undulations of the ether banish darkness and kindle light, without interfering with the action of one law of nature.

Take another instance. The whole science of astronomy—the science of exact mathematics—is built upon a mystery. Much has been discovered, and much has been demonstrated in this science. The magnitudes, the distances and the motions of the heavenly bodies have been calculated, and these calculations have been a thousand times verified by the accomplishment of the revolutions, eclipses and conjunctions of those bodies at the exact moment computed. But these wonderful computations all are based upon a mystery, a mystery to which a name, indeed, has been given; Sir Isaac Newton called it *Gravitation.* But what is gravitation? and why should matter have gravitation? No man can tell. This is a mystery—an insoluble mystery. But where would

be the philosophy, where would be the common sense of the man that would cast aside or deny all the sublime facts which this science has brought to light and established, because it is connected with a mystery? Why then deal with the doctrines of religion in this way?

But not to dwell on themes so lofty—*we ourselves* are so many bundles of mysteries. Who that has studied his own constitution of body or mind but must repeat the exclamation: "Behold, I am fearfully and wonderfully made!" The metaphysician studies the human mind, and pushes his inquiries into all the intellectual powers and emotional sensibilities of its constitution; and the anatomist dissects the human body, and examines its parts and functions, its brain and ganglia, its nerves and fluids; and each makes important and interesting discoveries; but both ever and anon reach a point where they are equally baffled—the union of mind and matter, and the power of the one over the other. Here is a mystery. Who can solve it? Where is the metaphysician that hath ever explained the action of mind upon matter, and the ready movements of flesh and bone, at the secret bidding of the mysterious spirit dwelling within? Or, where is the anatomist who hath laid bare that spirit, or with his searching knife traced out its points of impact and influence upon our material system? No; there is here a mystery. And we repeat our question, where would be the philosophy or the reason of the man who would reject both these branches of human science, because when pursued up to a certain point they land him in a region of mystery, or bring him to facts which he cannot understand or explain?

If, then, all the departments of human science are thus connected with mysteries on every side, and if no man of sound mind deems the existence of such mysteries a

valid reason for rejecting these sciences as so many delusions, why should mystery be urged as a reason for disbelieving and discarding the science of Divine Truth and Grace—the science of all sciences? Why, it is precisely here, if anywhere, we should expect to meet with mysteries; for if we are not able to understand the action of our own mind upon our own body, much less are we qualified to comprehend the operations of the Eternal Holy Spirit in enlightening and regenerating the fallen and depraved soul of man.

But the operations of the Holy Spirit, like the undulations of the luminiferous ether, *are proved by their effects.* The Ether is an element altogether beyond the reach of our senses; we can neither see, nor hear, nor feel its vibrations; yet we are well assured of their existence and action by their effects, which are nothing less than the ocean of light which fills the concave of the heavens, and robes the earth in its vestments of endlessly varied colors. The same is true of the Holy Spirit, and of his gracious agency. No man hath seen the Spirit at any time, nor heard his approach to the heart he designs to renew and sanctify; but we are fully assured of his presence and working in that heart by the effects wrought, effects concerning whose reality there can be no more doubt than about the reality of the light of day, or of the colors of the flowers of the field. As an example and illustration of the power of the Holy Ghost upon the hearts of sinners, see that aspiring young Rabbi, brought up at the feet of Gamaliel; a man of keen sight and vigorous intellect; zealous for the Law as Shammai, and learned as Hillel in all the traditions of the elders; the friend of the priests and the commissioner of the Sanhedrim; burning with wrath toward the infant cause of Jesus, and breathing out threatenings and slaughter against all his humble

adherents; a man who regarded with unutterable horror and disgust the very idea of accepting as the Messiah him who had been hanged on a tree. See him advance toward Damascus in his mad and murderous career; as he nears the city, he is suddenly arrested—is wrapped in a sheet of brightness without, and illumined as with the noonday light within! He falls to the earth. The despised Nazarene speaks to him; and the Holy Spirit reveals him as the Son of God. A total change passes over him. He arises from the ground a new and another man. He fell an enemy, he rises a friend. He fell a proud and intolerant Pharisee, he rises an humble and penitent Christian. Another life and another spirit have been implanted within him. From being the persecutor and murderer of the followers of Jesus he becomes himself a disciple—becomes an Apostle of the faith which erewhile he sought to destroy. And soon we behold him, willingly, joyfully, forsake the friendship of the rich for the society of the impoverished, a condition of ease and honor for a life of unrequited toil, the prospect of fame for the certainty of disgrace, and the enjoyment of competency for the suffering of cold and nakedness and hunger and thirst,—"accounting all things but loss for the excellency of the knowledge of Christ Jesus his Lord." Yea, we see him go through the world—go through perils and privations and sufferings, with his eye, in transport of joy, riveted upon what was once to him the symbol of shame, exclaiming: "God forbid that I should glory save in the cross of our Lord Jesus Christ, by whom I am crucified to the world, and the world unto me!"—What a change have we here! What a translation from darkness to light! What a conversion of the lion into the lamb! How amazing the difference between the persecuting Pharisee and the devoted Apostle! Is not this a new

creature—*a new creation?* Do not the effects produced demonstrate the character of the Cause? Can we any more doubt that the regeneration of this man was the work of the Holy Spirit, than that the illumination of the firmament is the work of the Sun? Assuredly, no.

Paul's case, however, wonderful as it is, is by no means singular or solitary. In every land, and in every age, the same gracious change has been witnessed in multitudes whom no man can number. And when in our own day, and among our own acquaintances, we see the thoughtless and giddy become devoutly serious; the profane become prayerful; the lascivious, pure; the selfish and avaricious, liberal and benevolent; the vicious, moral and religious; the proud and passionate and quarrelsome, meek and mild and gentle; when we see such changes, as we often do, have we not as clear evidence to believe that they are the operations of the Holy Spirit, as we have to believe in the action of the wind, when we behold the trees bend and sway, or the waters roll in billows, or the clouds careering across our sky, though we cannot see it, neither tell whence it cometh nor whither it goeth? As the wind is known by its effects, so the Spirit by his fruits.

## ANALOGY VI.

*As the light of the Sun of Nature cannot fall upon any earthly substance without producing in it a change, chemical or mechanical--so the light of the Sun of Righteousness cannot shine upon any human soul without affecting it either for life or death.*

### Phenomena.

In the estimation of the generality of mankind the sunlight is sunlight, and nothing more. It statedly illumines

and pleasantly warms the world around them, and that is about all they know, or care to know, about it. Concerning its deeper functions and all-affecting influence in the system of creation they have never inquired. Its great but hidden agencies have never occupied their thoughts for an hour. They notice no marked change passing over the aspect of nature, or taking place in their own feelings, when the Sun rises, or when it sets; and when it arises again on the morrow all things to them continue as they were before. They see their children play beneath its beams, and the flowers bloom amid its radiance; but the idea has never dawned upon their minds that the buoyant spirits of those children, no less than the beauty of these flowers, are daily and hourly dependent upon its agency. To them the sunlight is among the most inoperative and feeble of earthly elements. They can see no great or special effects produced by it on the land, or on the sea, or in the air; and being thus so unlike all the elements with which they are accustomed to associate power, they infer that it has no such power. The wind rushes and rends its way through the forest, the flood of waters sweeps away whatever may lie in its course, and the lightning shivers or consumes whatever it may alight upon; but the sunlight effects no such sudden changes or terrible destructions; it simply shines, and harmlessly warms the face of the earth. Such is the common estimate of the sunlight. Yet, in reality, this is one of the most potent and irresistible agents in the whole system of nature.

The sunbeam is a union of three elements of power, or a combination of three distinct species of rays. The first are its luminous rays, which stimulate the organ of vision, and give it light; the second are its heating rays, which are recognized by the general sense of feeling;

and the third, its actinic rays, which affect the chemical composition of substances. These three, singly or conjointly, are perpetually and powerfully influencing all created substances, animate and inanimate, throughout the world; they create all motion, produce all color, agitate the particles that compose all substances, break up the strongest chemical affinities, and effect new combinations. In short, no substance, organic or inorganic, simple or compound, can be exposed to the rays of the Sun without undergoing a chemical or mechanical change, or both.

To prove and illustrate these general statements we advert to a few particulars. Let the sunlight fall upon the *atmosphere*, and immediately it not only illumines it throughout, but changes its temperature, disturbs its equilibrium by currents, and sets in vibrating motion its every atom; and glancing through its clouds, it invests them with all the gorgeous colors of the rainbow, expands or contracts their dimensions, shifts their positions, and sets in operation the constant interchange of particles between their lower and upper strata, whereby their suspension in the air is continued and their descent to the ground prevented. How stupendous are these operations of the gentle sunbeams! What numbers can express the cubic miles of air, or the tons of watery vapors that are thus perpetually set and maintained in all the motion and whirl of machinery over half the surface of the globe!

Again, the solar rays falling upon the watery wastes of the *ocean* produce similar effects; they sensibly warm it throughout its whole expanse, and thereby create and perpetuate a general system of currents or streams in its waters, which are of the utmost importance to the temperature of the whole globe; they also draw up from

its surface vast quantities of invisible exhalations, which in the higher regions of the atmosphere condense into clouds, and in time descend in showers to water and refresh the face of the whole earth. Thus every drop of rain is the product of the Sun's rays; it owes its birth from the ocean to these rays, it owes its ascent into the clouds to them, it owes its transportation from that distant region to the currents of air they have created, and it owes its descent to the earth to their abated or modified influence.

Equally great and marvellous is the influence of the sunlight upon the *vegetation* of the world. It is this stimulant that sustains all its vital functions; by its aid plants breathe, that is, part with their oxygen and take in carbon; to it they owe the color of their leaves and flowers, and also the fragrance and flavor of their fruit. The growth and the very existence of every tree, or plant, or blade of grass that springs out of the soil are dependent upon the varied influences of the solar rays.*

Nor is the *living creation* less dependent upon the light of the Sun. Its manifold influences, indeed, constitute the fountain of their life and health and happiness; deprived of it, all would quickly sicken and perish and return to the dust. All this is obvious from what has been said in a previous chapter.*

Nor is the solar influence confined to the foregoing provinces of creation; even the cold hard *metals* and *minerals* of the ground placed beneath the sunbeams undergo various and remarkable changes. The granite rock, which presents its uplifted head in firmness to the driving storm; the blocks of marble which genius has framed into forms of architectural symmetry and beauty; and the brazen metal which is intended to commemorate

* See Part I., Analogy VI.

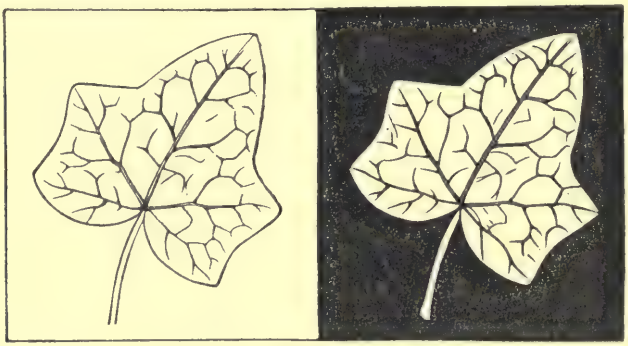
the great acts of man, and which in the human form proclaims the hero's deeds and the artist's talents, are all acted upon, and destructively acted upon, too, during the hours of sunshine; and, but for provisions of nature no less wonderful, would soon perish under the delicate touch of this the most subtile of the agencies of the universe.

Let the Sun's rays fall upon a mass of *iron*, and they will separate its very atoms farther from one another, and thus sensibly increase its size; so that the engineer, when he lays in place the heavy bars of a railroad track, finds it necessary to leave a calculated space between rail and rail, to allow room for their expansion beneath the summer Sun. Equally marked is the influence of the sunlight upon other minerals. Take the *sulphurate of arsenic*, a beautiful mineral of a ruby red color and of the form of splendid crystals, and expose it for a certain length of time to the light, and it becomes pliant and falls into powder. Again, take the *mineral chameleon*, which in darkness remains unchanged, and lay it in the sunlight, and it is almost instantly decomposed. The sunrays affect the constitution of other substances still, so that they undergo a complete change of color: the silver ore called *horn silver*, which in the darkness of the mine is colorless, but exposed to the sunlight immediately assumes a violet tint; and, by similar exposure, the *yellow phosphorus* becomes red phosphorus.

The power of the solar light is also strikingly displayed in *mineral solutions*. A solution of the sulphate of iron in ordinary water may be preserved for a long time, in the dark, without undergoing any change; but let it be exposed to the sunlight, and a precipitation of oxide of iron is rapidly produced. The same thing occurs with a combination of platinum and lime. Indeed, precipita-

tion is at all times, and under all circumstances, accelerated by the Sun's rays.

Another interesting illustration of the power of the sunlight we have in the solution of *lunar caustic.* Brush a sheet of white paper with this fluid, and, as long as it is kept in darkness, it retains its whiteness; but lay it in the light of the Sun, and to see the effect more strikingly, place on its centre a few leaves, and in a very short time all the exposed portion of the paper will turn black, while that protected by the leaves will be found to remain white, as in the annexed figure. This simple



CHEMICAL EFFECT OF SUNLIGHT.

experiment was the first step toward the wonderful art of photography, whose beautiful productions all are accomplished by means of the sunlight.

The light of the Sun powerfully affects even the *impalpable gases.* Fill a glass vessel with chlorine and hydrogen, and they will not unite in darkness; neither will chlorine and carbonic oxide; but if either of these gaseous mixtures be exposed to the sunlight, it will combine rapidly, and that, too, with an explosion.

We add but one more illustration: Light exerts an important and curious influence on the process of *crystallization* of various substances. Let a strong solution

of the sulphate of iron, in water, for example, be placed in a shallow dish; and let one-half of the dish be covered with a black cloth; then set it in a darkened room, permitting only a single ray of light to enter, so as to strike on the solution in the uncovered part of the dish. Thus one-half of the solution will be exposed to the light, while the other half will be in darkness. After the dish has stood in this situation for a day or two, it will be found that the solution in the part that has been exposed to the light will be completely crystallized, while no signs of crystallization will be seen in the part kept in the dark.

Such are the marvellous and universal powers of the Sun. No material object, solid or liquid, simple or compound, animate or inanimate, can be exposed to its rays without being affected in one way or another by their great and varied influences. Yea, their forces penetrate even to objects that are not immediately exposed to them; from them nothing is hid, nothing exempt. "Under the excitement of the several agencies of the solar beams," says the author of *The Poetry of Science*, "motion is given to all bodies by the circulation of caloric, and a full flow of electricity is sent around the earth to perform its wondrous works. The solar influences, which we regard as light, heat, actinism, and electricity, are active in effecting an actual change of state in matter, and in all probability in influencing the great magnetic phenomena of the world. The sunbeam of the morning falls on the solid earth, and its influence is felt to the very centre. The mountain-top catches the first ray of light, and its base, still wrapt in mists and darkness, is disturbed by the irradiating power. The crystalline gems, hidden in the darkness of the solid rock, are dependent for that form which makes them valued by the proud, on

the influence of those radiations which they are one day to refract in beauty. The metals locked in the chasms of the rifted rocks are, for all their physical peculiarities, as dependent on solar influence as is the flower which lifts its head to the morning Sun, or the bird which sings at heaven's high gate."—Light, the light of the Sun, is one of the great forces of the universe; and who can adequately appreciate the evidences of Power and Wisdom and Beneficence connected with this glorious creation! How little do they comprehend its full value who see nothing in it beyond its convenience for their petty affairs, and transient interests!

## Teachings.

Interesting and important as these facts in the world of matter are, they point us to facts still more interesting and important in the world of mind. In them we discern a striking and instructive analogy to spiritual truths of vital moment. As the Sun of nature thus leaves no earthly substance upon which it falls uninfluenced chemically or mechanically, *so the light of the Sun of Righteousness cannot shine upon any human being without effecting in him a change either for the better or for the worse.*

The light of Divine Truth, like that of the solar orb, is necessarily influential and effective. The Gospel of Christ, from its very nature, will not allow man to hear and understand its sacred and gracious messages without affecting him in his deepest interests. This light comes to him from heaven, and comes clothed with heaven's power, to change and fashion him into a vessel of mercy, fitted for glory; or into a vessel of wrath, fitted for destruction. It leaves no soul of man upon whom it shines unaffected.

The *nature* of the effects produced by the light of the

Sun of Righteousness, like that of the Sun's light, is determined by the character of those upon whom it descends. The influence of the sunlight varies with the nature of the substances upon which it falls; its warm rays falling upon the wax, and it is melted; upon the clay, and it is hardened; upon one fabric, and it is bleached; upon another, and it is blackened; upon the plant that has its roots imbedded in the soil, and it flourishes; upon that whose roots are exposed, and it dies; upon the clear lake, and it exhales refreshing moisture; upon the stagnant marsh, and it sends forth fatal malaria; upon the living creature, and it is animated and delighted; upon the dead carcass, and it is corrupted and decomposed. So diverse, so opposite are the effects wrought by one and the same Sun, according to the differing natures of the objects upon which its light falls. The same holds true of the light of the Sun of Righteousness. The character of those upon whom His divine light shines, likewise, determines the nature of the effects produced upon them. It depends mainly upon the disposition of the man himself—for he is a voluntary agent—whether the heavenly light that shines upon him shall prove to him "a savor of life unto life, or of death unto death." If he receive it in an humble, docile, and obedient spirit, it will be life; but if in a proud, unbelieving, and rebellious spirit, it will be death.

The light of the Sun of Righteousness works *a change in our moral and religious obligations.* It is required, and it is accepted of God according to that a man hath, whether it be of ability or of light. When a man, therefore, who has had nothing more than the light of nature for his guidance, is brought into the superior light of Revelation, his obligations to God and man become greater and higher in a corresponding degree. The

measure of his light becomes the measure of his duty. As soon as the Gospel is proclaimed to him, the Gospel becomes to him the rule of life. A knowledge of his duty binds him to the performance of it. This is the law of heaven; to it there is no exception, and from it there is no escape. "To him that knoweth to do good, and doeth it not, to him it is sin." It follows, therefore, that from the hour the light of the Sun of Righteousness shines upon us, and makes duty plain before our eyes, there remains for us no rule but to walk according to that light. No sooner is the command sounded in our ears, "Thou shalt love the Lord thy God with all thy heart, and thy neighbor as thyself," than it becomes our bounden duty to obey it. From the moment Christ is proposed to our acceptance as our Saviour from sin, we come under the most sacred obligation to commit our souls into his hands. Not to receive him is to reject him; and to reject him is death. So great is the change wrought in our standing and duty by the coming of the light of the Sun of Righteousness.

The more direct and clear his divine beams fall upon us, the more decisive their effects upon our moral and religious character. "If I had not come and spoken to them, they had not had sin; but now they have no cloak for their sin." These words spake Jesus to the Jews. Their former advantages had been very considerable, yet were small compared with those which they enjoyed under his luminous ministry. Their previous light was but as the gray dawn to the noonday Sun when compared to the bright and glorious light which now shone around them from his teachings and miracles and example. As a consequence their sin in their former condition was as nothing to their sins under their present privileges. Hence Christ speaks as if their previous offences were not to be

noticed in comparison with the guilt of their unbelief and disobedience amid the blaze of light which he had shed upon them. He fixes attention upon their present guilt as if it had been their only guilt—"If I had not come and spoken to them, they had not had sin; but now they have no cloak for their sin." And all this is equally true of all that enjoy the light of his Gospel in the present day.

The light of the Sun of Righteousness *affects every heart, and works a change in its disposition and character.* It never fails to soften or to harden it. It is impossible to hear and understand the truths of the Gospel without being essentially and eternally affected by them. Like the Sun in the heavens, the Gospel is designed and fitted to promote the good of all—to win them from sin, to lead them to holiness, and to save them with a glorious and everlasting salvation. And it actually produces these effects on the minds of all who cordially receive it, and yield their hearts to its transforming influence—"they are renewed, they are sanctified, they are justified in the name of the Lord Jesus, and by the Spirit of our God." But upon the minds of the carnal and sensual, of the worldly and heedless, it produces entirely opposite effects. Instead of melting it indurates, instead of quickening and refining the moral sensibilities it blunts and deadens them, instead of elevating to more devout aspirations it sinks to greater apathy and sinful stupidity:—and all this, not through any tendency to foster evil in the Gospel itself, but through the evil that is in man, resisting and perverting its legitimate influence. And by continuance in this course, a *habit* of opposition and indifferency is soon established; and the habit inevitably issues in blindness of mind and hardness of heart; so that presently he becomes unimpressible alike to the invi-

tations of mercy and to the threatenings of justice. Eternal things cease to move him, cease to interest him. He can listen to the thunders of Sinai and to the groans of Calvary with equal indifference. Henceforth the Gospel of the Son of God, and all the gracious means of salvation are to him but "the savor of death unto death."

From the foregoing facts it obviously follows, that the light of the Sun of Righteousness decisively affects *the eternal destiny of all that enjoy it.* This light is clothed with mighty power; it bleaches or blackens, it saves or destroys. Those who walk according to the light will be conducted to glory, honor and immortality; but they who love darkness rather than light, shall stumble and fall and perish. And of all the multitudes who shall stand before the judgment seat of Christ, none will be burdened with weightier guilt, or fall under more aggravated condemnation, than those who have lived beneath his light, and yet neglected or abused its great advantages. These are they who are described under the image of "the servant who knew his master's will, and did it not; and, therefore, was beaten with many stripes." They have repelled the advances of divine love—they have braved the warnings of divine justice—they have slighted the offers of divine mercy. With their eyes open they have advanced to ruin and to woe. And when they come to appear before the great tribunal, a holy universe will approve the sentence that will assign to them severer punishment than that of Tyre and Sidon, and sink them to lower depths than those of Sodom and Gomorrah.

## ANALOGY VII.

*As a small pencil of light from the Sun of Nature, entering into a dark room, serves to reveal many phenomena pertaining to that glorious orb, otherwise invisible—so a beam from the Sun of Righteousness, entering the dark mind of man, reveals in Him wonders of love and grace, all before unknown.*

### PHENOMENA.

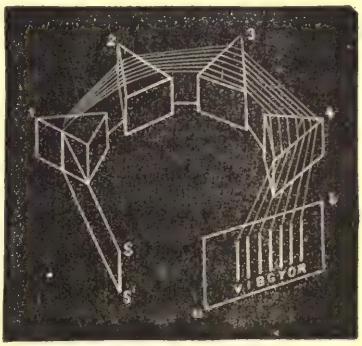
IT is a well-known fact that a sheet of white paper may be written over with certain transparent fluids so as to exhibit no trace of any mark or character; the eye glancing over it would not even suspect the existence of any writing thereon, the surface appearing as white and unstained as if a pen had never touched it. But if that sheet of paper be subjected to the action of certain other fluids, or be exposed to a certain degree of heat, the writing will be brought out distinctly, and become as legible as if it had been written with ink. Very similar to this is the pure white sunbeam; on this likewise, in its natural condition, the eye can discern no mark, or line, or character; it appears as untinted and unsullied whiteness. Yet, in reality, it bears on its bosom records of the most interesting and important nature; it is, in fact, a volume written within and without; and the bringing out, so to speak, and the deciphering of this writing on the sunbeam constitutes one of the most astonishing triumphs of modern science.

In a former chapter (P. II., An. 2.) we have seen that if a beam of sunlight enter a dark room through a small aperture, and be made to pass through a glass prism, it will be separated or dispersed into bands of different colors, and form on the opposite white wall a gorgeous *spectrum* (as it is called), presenting all the varied tints of the rainbow—violet, indigo, blue, green, yellow, orange and red. Diligent investigation has further shown that each of

these colors is characterized by properties peculiar to itself, and that they differ from one another in many essential respects. They differ in the extent of space they cover in the spectrum: if the whole length of the spectrum be divided into 100 equal parts, the red will cover 12 of those parts, the orange 7, the yellow 13, the green 17, the blue 17, the indigo 11, and the violet 23. They are also of unequal brilliancy: if the greatest intensity of light which lies between yellow and green were expressed by 100, the light of orange would amount to 64, the middle red 9, the outer red 3, the green to 48, the blue to 17, between blue and violet to 3, and violet itself to less than 1. Again, they possess very different degrees of heat; and they also carry in them very different measures of actinic or chemical influence. Thus what appears, naturally, to be a single and simple substance is found to be a very complex thing. But all that we have now stated is only the beginning of the wonders wrapped up in the sunray. By patient study and ingenious contrivances this marvel of creation has been made to reveal hundreds and even thousands of different characters or symbols, all full of significance, and which scientific men, in these very last days, have learned to read and interpret as readily and as certainly as our great scholars have the hieroglyphics of Egypt, or the cuneiform inscriptions of the ancient monuments of Assyria.

The earliest experiments in the dispersion of light were made with a single prism; but study and ingenuity soon improved upon this method. Combinations of several prisms ere long were formed into instruments called *Spectroscopes.* In these the light is admitted through a fine slit instead of a round hole, and then passed through a succession of prisms. By this arrangement, the portion of light already dispersed by one prism is received upon

another, and by means of this is further dispersed; and so on with a third, a fourth, etc. In this way the spectrum is greatly expanded, as a minute object is magnified when viewed through two or more lenses, so that numerous lines, which were before invisible, come to view, some more strongly and some more faintly marked. This adjustment of prisms, together with the advantages gained therefrom, will be readily understood by reference to the annexed figure. S S′ is the slit through which the light enters; 1, 2, 3 and 4, are the prisms through which the light successively passes; and *a b* the screen on which it finally falls dispersed in the form of a spectrum. The beam of light falls first on prism 1. If a sheet of white paper were placed to intercept this beam anywhere between S .S′ and prism 1, there would be seen upon it a bright bar of light shaped like S S′. Prism 1 disperses this beam, and it falls thus dispersed on prism 2. If the sheet of paper were placed to intercept the beam anywhere between prism 1 and 2, a short spectrum would be seen upon it. This beam again passes as before to prism 3; and if the paper were placed between 2 and 3, a longer spectrum would be seen. Between 3 and 4 the spectrum would be still longer. And, lastly, the rays, widely dispersed, fall upon the screen *a b*, and thereon form a lengthened spectrum, complete, but somewhat fainter than when one prism only is employed. On this screen the violet falls at V, the indigo at I, and so on to the red at R. Between the extreme violet end of the spectrum and the extreme red end, lie the innumerable



A SUNRAY EXPANDED.

tints of the rainbow, fading undefinably one into the other; at intervals, however, there are wider or narrower spaces, which exhibit no colors, but appear as *dark lines*, running across the spectrum parallel to one another, and situated at various distances. These, under the action of a strong battery of prisms, appear in great numbers.

For certain purposes, various instruments differing considerably from the above are sometimes employed, and of the principle of which an idea may be gained from the accompanying representation. In this, the ray of light enters through the tube A, and passing through a narrow slit in the end of it, falls upon the first prism to the right; from this it passes to the second, and so on to all the remaining prisms, till it forms a complete circle, and returns in an elongated spectrum to enter the telescope B, through which it may be seen with superior advantage.

THE PATH OF A RAY THROUGH NINE PRISMS.

The *dark lines* brought to view in the solar spectrum by contrivances such as the above, let it be observed, are not occasional or accidental, but permanent, and belong to the Sun's light *as such*. They are found in the same relative positions, and are marked with the same relative distinctness or faintness at all times and under all circumstances, whether the light comes direct from the Sun at midday, or by reflection from the moon at midnight.

The first to observe these lines was Wollaston; he saw,

however, but two or three only of them; but in that small beginning lay the germ of the most wonderful discoveries man has yet made. After him, Fraunhofer, with immeasurable patience and improved contrivances, prosecuted the study of these mysterious lines; and by the year 1814 had detected and mapped no less than 576 of them. The relative position in the spectrum of the principal of these, as well as the colors within which they lie, are indicated in the figure annexed, which will serve by a glance to convey a clearer idea of them than any mere verbal description. A is a clear line close to the limit of the red end of the spectrum. B is a well-defined line also in the red. Between A and B is a band of several finer lines marked *a*. C is a dark and well-

FRAUNHOFER'S LINES.

marked line. Between B and C Fraunhofer counted nine fine lines; between C and D about thirty. D consists of two strong lines close together. Between D and E he counted eighty-four lines. E is a band of several lines, the middle line of the set being stronger than the rest. At *b* are three strong lines, the two farthest from E being close together. Between E and *b* he counted twenty-four lines, and between *b* and F more than fifty. F, G and H are strong lines. Between F and G, and between G and H, he counted one hundred and eighty-five and one hundred and ninety respectively; he found many lines also between H and I, the violet end of the spectrum.

Since the day of Fraunhofer a multitude of skillful

and indefatigable workers have devoted themselves to promote this branch of science, and great progress has been made both in the discovery and interpretation of the spectrum lines. Upwards of 2,000 of these lines have already been marked and mapped down, with all the precision of a geographical survey, and more are continually being brought to light, as instruments are improved and skill in the use of them is being perfected.

What then is the meaning of these bands and lines observed in the solar spectrum? What significance do they possess, or what instruction do they offer, to make them worthy of the persistent and profound study bestowed upon them? Before we can give an intelligent answer to these questions it will be necessary to devote a few lines to an explanation of the mode and means of their interpretation.

The Sun, let it be observed, is not the only body capable of casting a spectrum; every other luminous object, —a lamp, a gas jet, a candle, a fagot, or even any incandescent substance, will give a similar spectrum. Luminosity is the only property or qualification necessary to the formation of a spectrum. Dark bodies are not available for spectrum analysis; if these are to be brought under its scrutiny they must first be rendered luminous. And chemistry and physics, in the present day, afford ample means for rendering luminous all substances, gaseous and ungaseous, and even the hardest metals and most refractory of earthly minerals.

Scientific men have devoted much time and study to the invention of means for creating any required degree of light and heat, and their labors have been crowned with eminent success. What is known as the Bunsen lamp creates a flame of such intense heat that it will even melt a quantity of platinum in a few minutes.

Magnesium, when heated up to a certain temperature, ignites and burns with a light so dazzling that the eye cannot bear to look upon it, and gives out an extraordinary amount of heat. The combustion of oxyhydrogen (*i. e.*, a mixture of two volumes of hydrogen with one of oxygen) gives a heat that is sufficient to melt substances which have borne unchanged the action of the hottest furnaces. If a thick wire of platinum (a metal very difficult to fuse) be held in this flame, it will melt like wax; or if a bundle of steel wires be placed in it, the steel will sputter about in a thousand brilliant sparks like a shower of fire, which will fall to the ground in great molten drops and run about in all directions. Platinum will melt at a heat of 2678° Fahr.; but the Drummond Lime-light will create a heat that amounts to 5070° Fahr. The most intense light and heat, however, yet known, are those of the electric spark which results from the union of positive and negative electricity, which is produced and maintained by a variety of ingenious contrivances, which we cannot stop to describe. The amount or degree of heat thus at the command of the scientist is sufficient to volatilize, or convert into luminous vapor, any metal or other substances that may be placed in it; and this vapor comes at once within the sphere of spectrum analysis.

Now, by these means, the spectra of a great many elements and substances have been obtained, and accurately recorded. Of these we just name a few. The *electric light* produces a continuous spectrum; that is, a spectrum unmarked by any dark or bright lines. All *incandescent bodies*, whether solid or liquid, also give a continuous spectrum. But very different spectra are obtained from vapors and gases in a glowing or luminous state; these, instead of a continuous succession of colors,

exhibit spectra marked by a series of bright bands separated one from another by dark lines or spaces. If by means of the Bunsen lamp, or the electric spark, a piece of *zinc* be volatilized, its luminous vapor will give a spectrum marked by one red band and three very beautiful bright blue bands. If a piece of *copper* be volatilized, its vapor will give a spectrum marked by three green bands. If zinc and copper be volatilized *together*, their mixed vapor will give a magnificent spectrum marked, not only by the red line and the three bright blue bands of the zinc, but also by the green bands of the copper; there is no commixture or confusion, but each of the vapors, though mingled, emits its own system of colored bands. The same holds true of the combined volatilization of other metallic substances. The vapor of *sodium* gives a spectrum distinguished by one bright orange double line; that of *lithium* by two colored lines or bands, one a brilliant red and the other a faint yellow; that of *thallium* by a bright green line and a set of violet-colored bands at some distance from it; that of *cæsium* by ten fine but distinguishable lines, of which two are blue and one yellow; that of *rubidium* by two bright blue bars, two green, two yellow, and four red; that of *ferrum* or iron by several hundreds of differing bright lines. The gases, *oxygen* and *hydrogen* and *nitrogen*, also, each give its own particular and distinctive system of bands and lines.

Let not the reader imagine that all these are merely fanciful or accidental results. Far, indeed, is this from being the case. The spectrum of each particular element or substance is distinctive and so permanent that the experienced spectroscopist can at once recognize it. By the number, the position, and relative brightness of the bands and lines in the spectra he can pronounce with certainty

the chemical constitution or nature of the vapors which produce them. The spectroscope is an instrument of surpassing sensitiveness and delicacy; nothing can escape its test. "When the balance, the microscope, and every other means of research at the command of the physicist and the chemist utterly fail, one look in the spectroscope is sufficient in most cases to reveal the presence of a substance. If a pound of common salt be divided into 500,000 equal parts, the weight of one of these portions is called a milligramme. The chemist is able, by the use of the most delicate scales and the application of special skill, to determine the weight of such a particle; but in doing so, he comes close upon the limits of his power of detecting by chemical means the presence of sodium, the chief element of common salt. But if that small milligramme be subdivided into 3,000,000 parts, we arrive at so minute a particle that all power of discerning it fails, and yet even this excessively small quantity is sufficient to be recognized with certainty in a spectroscope. We have but to strike together the pages of an old dusty book in order to perceive immediately in a spectroscope placed at some distance, the flash of a line of yellow light which we shall presently learn is an unfailing sign of the presence of sodium."*

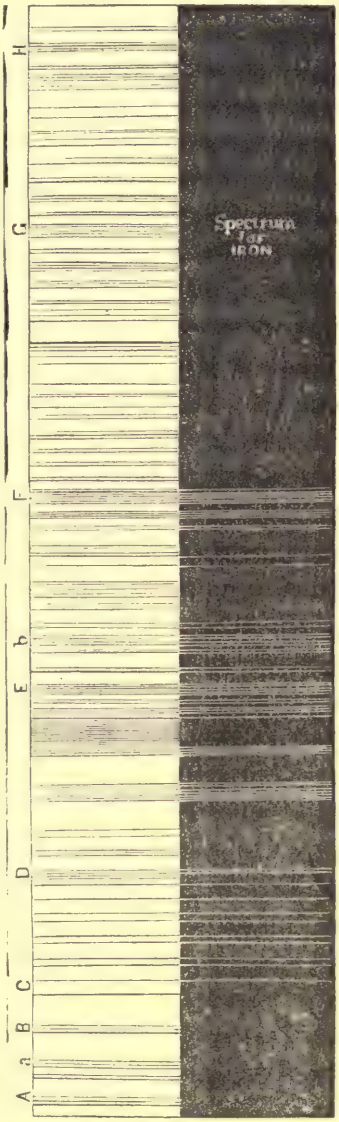
We are now prepared to speak of the significance of the dark lines in the solar spectrum. It has been discovered, and has been proved in various ways and by innumerable experiments, to be a general law that, "gases and vapors in transmitting light from any source *absorb* precisely those rays which they themselves emit when rendered luminous." For example, luminous sodium vapor gives a spectrum of one bright orange double line; that is, what it emits is this yellow light only. Now, if the

* Schellen's *Spectrum Analysis*, p. 5.

white light of Bunsen's lamp, or of the electric arc, be made to pass through the sodium vapor, that vapor will absorb or extinguish from the light just those yellow rays which it emitted, and there will thus be left in their room a dark double line, in precisely the same position, and precisely of the same width. Take again luminous lithium vapor, which gives a spectrum of one intense red line and a fainter orange one; this, likewise, will absorb just those same rays or colors from the white light sent through it, and two unequally dark lines will appear in their stead in exactly the same place. The same holds true of all other luminous vapors and gases; —when pure white light passes through them, for their own characteristic colored lines in their respective spectra, they substitute invariably dark lines, of exactly the same breadth, in exactly the same position, and of exactly the same relative intensity. Hence, as the various substances of our globe can be recognized by their spectra, so the dark lines in the spectrum of the Sun afford a key to the recognition of the materials which compose that glowing and brilliant orb.

To make this perfectly plain the reader is referred to the annexed figure, where the coincidence of 65 lines in the spectrum of iron with the corresponding dark lines in the solar spectrum are represented; the entire number of coincidences belonging to this metal amount to no less than 460. In all these there is the most perfect correspondence; every line of the iron spectrum appears as a dark line in the spectrum of the Sun, and not only that, but strong line for strong line, and faint line for faint line. The complete coincidence of so many bright lines in one and the same substance with the same number of dark lines in the solar spectrum, shows conclusively that those dark lines are to be ascribed to the absorptive

effect of the vapor of iron in the Sun's atmosphere, through which the pure white light of his incandescent nucleus must pass, in its outward flow, to reach the earth. The dark lines are those of *iron vapor*, and of no other substance; and that vapor by reason of the extreme heat of the nucleus, must be around the globe of the Sun, as *it can be nowhere else*. "Hence," says Kirchhoff, "the observations of the solar spectrum appear to me to prove the presence of iron vapor in the solar atmosphere with as great a degree of certainty as we can attain in any question of natural science."



COINCIDENCE OF SOLAR AND IRON LINES.

While Kirchhoff himself entertained no doubt of the correctness of his conclusion, yet, to satisfy others, he took the trouble to calculate, from the doctrine of probabilities, that the chance of his being mistaken was less than 1 to 1,000,000,000,000,000,000. Subsequent discoveries have wiped out even this faint room for doubt.

What is thus sufficiently proved by the one element of *iron* is abundantly corroborated by similar coincidences of

the lines of numerous other substances. According to the investigations of Angström, the numbers of the bright lines of the following substances coincident with equal numbers of dark lines in the solar spectrum are as follows:—

| | | | |
|---|---|---|---|
| Hydrogen | 4 | Titanium | 118 |
| Sodium | 9 | Chromium | 18 |
| Iron | 460 | Nickel | 33 |
| Calcium | 75 | Cobalt | 19 |
| Barium | 11 | Aluminium | 2 |
| Magnesium | 4 | Zinc | 2 |
| Manganese | 57 | Copper | 7 |

There have been also partial coincidences of gold and other substances detected; and there are reasons to believe that several more elements will be discovered, as instruments will be carried to a greater degree of perfection. From all this, it is regarded indubitably proved that *all the above-named substances, which belong to our globe, enter also into the composition of the Sun.* And the inference is natural and legitimate that these same elements are common to all the planets.

These, indeed, are astonishing facts to be determined concerning a globe situated at a distance of more than ninety millions of miles from us; and yet the wonders end not even here. Not only has Spectrum Analysis proved the existence of a vaporous and gaseous envelop encompassing the Sun, but also, by means of certain variations observed in the spectrum lines, has ascertained its comparative density, and proved that its pressure at the surface of the solar orb is less than that of our atmosphere at the surface of the earth. But the most marvellous of all the achievements of this science, perhaps, is its determination, by the accurate measurement of small displacements in the position of these lines, whether a luminous body in the heavens is approaching us, or receding from

us, and at what speed it is travelling. In this way it has been ascertained that vast luminous clouds of gaseous vapors sometimes travel over the surface of the Sun, like fearful cyclones, at the astonishing rate of 120 miles per second. "By an observation not occupying many seconds," says Proctor, "any clear-sighted person, armed by our opticians with adequate spectroscopic power, can measure the swiftness of the solar windstorm, can gauge the pressure of the solar atmosphere, and can estimate the relative temperature of spot and faculæ, of photosphere and chromatosphere, and, lastly, of the higher regions to which eruptions cast those masses of glowing vapor which form the solar prominences."

Such, in brief, is the wonderful knowledge that has been gained of the great Fountain of Light within the past few years,—and all communicated by the gentle sunbeam. The ray of light, forsaking its celestial home, and, like a winged messenger, descending to the earth, enters the still and darkened apartment of the spectroscopist, and there reveals all these wonders concerning its parent orb—its physical constitution, its material elements, its intensity of light and heat, its stupendous storms and agitations, and its outflowing influences for the benefit of the hundred worlds that revolve around it—wonders otherwise all unknown to man. And who that rightly contemplates such phenomena as these but must exclaim with the devout Apostle, "O, the depth of the riches both of the wisdom and power of God! how unsearchable are his ordinances, and his ways past finding out! Who hath known the mind of the Lord, or who hath been his counsellor? Or who hath first given to him, and it shall be recompensed to him again? For of him, and through him, and to him, are all things: to whom be glory forever. Amen."

## TEACHINGS.

Now, as a ray of light from the material Sun, entering into a dark room, thus serves to reveal so many phenomena pertaining to that glorious orb, which otherwise would have remained forever unknown; *so a beam from the Sun of Righteousness, entering a dark mind, there reveals wonders of love and grace in Him, which that mind never knew, never conceived before.*

The spectroscopist, sitting in his dark apartment, with the light of day and all the charms of nature shut out, is an apt and true emblem of the soul in its natural condition, in its unrenewed and unenlightened state. Man by nature is in darkness, deep moral darkness. The truth or light of the Gospel may shine all around him, as the light of the Sun around the scientist's shut-up room, but he perceives it not, realizes not its spiritual meaning. He is in the dark; he sees not the glories of the Sun of Righteousness, apprehends not his true character, nor the gracious nature of his mission into the world. "Having eyes, he sees not; and having ears, he hears not." *Sitting in darkness and in the region and shadow of death*, is a true description of the condition of the whole human race in their native state; and a principal object of the advent of the Son of God among men was to impart light to them. "In that day," saith the prophet, "shall the deaf hear the words of the book, and the eyes of the blind shall see out of obscurity, and out of darkness." Hence it is said even of all who have become true Christians, "Ye were some time darkness, but now are ye light in the Lord"—"Now are ye children of light"—"A peculiar people, that ye should show forth the praises of him who hath called you out of darkness

into his marvellous light"—"He that followeth me shall not walk in darkness, but shall have the light of life."

We have seen that when the sunray gains admission into the philosopher's dark apartment, and is by his prism cast upon the opposite white screen, what a beautiful display of the glorious light of the Sun is at once spread out before him; and, as he further sifts and studies those rainbow colors, what marvellous discoveries he makes in them concerning that distant orb! Now this, all this, is but an emblem of the far more wondrous and important revelations made by a beam from the Sun of Righteousness, when it enters the dark soul of man. Oh, what new views are then imparted! what new apprehensions of his nature and offices are then gained! what grace and glory are seen to invest his person and his character!

So marked, so real, so great is this illumination of the soul, that St. Paul compares it to nothing less than the first rising of the Sun upon the original darkness of our globe: "God," says he, "who commanded the light to shine out of darkness, hath shined into our hearts to give the light of the knowledge of the glory of God in the face of Jesus Christ." As the darkness and mists that before hid the face of primeval nature were chased away by the first warm and luminous rays of the rising Sun, and vale and hill, tree and flower and rippling waters appeared in their true forms and real beauty,—so the ignorance, prejudice and unbelief which before enveloped the soul are dissipated by the beams of the Sun of Righteousness, and the world of spiritual things appears for the first time in its true character and interest. "Old things now pass away; behold, all things become new."

Before the heavenly light came, Christ was but a de-

scendant of Abraham like other Jews, and differing from them in nothing save in his superior wisdom and morality. At best he was looked upon but as a more exalted Plato; or more virtuous Socrates; or as the most enlightened, pure, and disinterested teacher the world had ever known. But now he is seen to be far more than all this—seen and believed to be "IMMANUEL, God with us"—"God manifest in the flesh"—"The brightness of the Father's glory"—"The image of the invisible God, by whom all things were created, that are in heaven, and in the earth, visible and invisible, whether they be thrones, or dominions, or principalities, or powers; who is before all things, and by whom all things consist"—"In whom all the fulness of the Godhead dwells bodily"—"Whom all the angels of God do worship." O the blessedness of this revelation! To Him the enlightened soul now ascribes all excellencies and every good and perfect gift, whether moral or material,—all the intellectual endowments of men and angels, all the splendor of the Sun and moon and stars, all the grandeur of the visible universe. All now seem to speak forth the praises of him who created them. In the varied and charming scenes of nature, he contemplates with unspeakable delight the benignity of their Divine Author; in its sublime objects, he admires his wisdom and power and goodness; and in its awful and terrible ones, he adores his majesty and greatness. The world is to him as a magnificent temple, illumined by the glory of its adorable Builder, and filled with the incense of praise arising from a thousand different altars!

The entrance of the Divine light also reveals Christ in an entirely new character as a TEACHER. A good and wise instructor of the people he might have been regarded before; but his teaching was felt to possess no special interest, to involve no personal concern, or to

come with any binding authority; his Gospel was read in much the same manner and spirit as were the *Epistles* of Seneca, or the *Meditations* of Antoninus. But now, that light from on high has entered the soul, he speaks as man never spake; his words—they are spirit and they are life, more to be desired than gold, yea, than much fine gold, sweeter also than honey and the honey-comb. "As a Prophet," says one who had experienced this Divine illumination, "how sweet are his instructions to a bewildered soul! How precious the words of his lips, which are the words of eternal life! How delightful to sit and hear him teach the way of duty and happiness, revealing the Father, and the wonders of the invisible state! How transporting to hear him declare upon what terms an offended God may be reconciled; a discovery beyond the searches of all the sages and philosophers of the heathen world. How reviving is it to listen to his gracious promises and invitations; promises and invitations to the poor, the weary, and heavy-laden, the broken-hearted, and even to the chief of sinners! The words of Christ have been my treasure, my support, and my joy, as they have been to believers in all ages. Never man spake as the man Christ Jesus!"

A beam of spiritual light entering the dark mind of man reveals Christ, likewise, as an ATONING SACRIFICE under a totally different aspect. While in his blindness, engrossed with the interests of time and immersed in the pursuits of the world, he neither knew his guilt nor saw his need of a Saviour. The death of Christ was to him but an untoward event, but an unhappy termination of a good man's life. He viewed it as brought about simply by the unreasonable opposition and rage of his enemies, as that of a thousand other great and good men had been. He saw not that the hand of God was con-

cerned in it, or that the purposes of his grace were fulfilled by it, or that the salvation of the world was to be secured through it. He realized not that there was in his own spiritual condition or character anything that demanded such a sacrifice on his behalf. Hence the death of Christ was to him but as the death of a martyr, or of one of the persecuted prophets. But now that his soul is enlightened, he sees in the death of the cross his only hope of life; sees that Christ was delivered by the determinate counsel and foreknowledge of God to be crucified and slain, to atone for the sin of the world; sees and believes that in virtue of his sacrifice alone he can find pardon, regain the favor of God, and inherit eternal life. Oh, how changed are now all his views of the amazing scene of Calvary! How widely different the sentiments and emotions with which he contemplates the agony and death of the bleeding Lamb of God! Having discovered his own deep sinfulness, and felt the keen pangs of guilt, how the sight moves and melts his soul; how it calms his troubled conscience, and soothes his anxious heart; how it changes the frowns of justice into the smiles of love, and the apprehensions of vengeance into delightful hopes of mercy! O how precious does Jesus now appear, with full atoning blood flowing from his sacred veins, with assurance of free forgiveness upon his gracious lips, and with his cross in his hand, as a key, to open wide the gates of heaven for his admission there!

> "Oh! the sweet wonders of that cross,
> Where God, my Saviour, groan'd and died!
> My noblest life her spirit draws
> From his dear wounds and bleeding side."

Let but the gentle rays of the Sun of Righteousness enter and illumine the soul, and he is at once seen and recognized as a DIVINE FRIEND, becomes the object of

supreme love, and the source of the most sacred joy. While living in darkness, Christ was to him but as a dim and distant character who had long ages since vanished from the world; or, if regarded as still living, yet was so far removed from this earthly scene as to be little concerned about its affairs, and much less about individual interests. What degree of belief he had in his existence and character yielded neither support, nor comfort, nor hope. But now, that the heavenly light is come, Christ is seen to be a Saviour near at hand, and not afar off; seen and felt to be a living present Friend. Yea, he is now felt to dwell and reign within, shedding abroad his love in the heart, and sweetly bending all his faculties and affections into harmony with his own holy will. Oh, Christ is now his light and life and highest joy! He is associated with all that he beholds, and with all that he experiences. Every blessing recalls him as the Giver, every deliverance as his Preserver, every sorrow as his Comforter, every sin as his Redeemer. When he closes his eyes at night, his last conscious breath is spent in prayer to him; and when he opens them in the morning, his first thoughts still ascend to him. And when he goes forth to the duties of the day, he is perpetually reminded of his presence. Every event and incident of life brings Christ before his mind. If he is favored with riches, Christ is still his crowning treasure, his pearl of greatest price; or, if he is doomed to poverty, the love of Christ is better to him than the gold of Ophir, or the merchandise of Tyre, or the wealth of Babylon. Christ is his all in all. His soul is penetrated and pervaded by a lively and constant experience of the excellencies of him who is the chief among ten thousand and the one altogether lovely. O could angels teach him their heavenly strains —could he speak in those burning seraphic words of

which Paul testifies that it is not possible for man to utter them!—he feels that he could not number his marvellous acts of love, or show forth half his praise; could not describe what to his soul he already is, much less what he hopes he will hereafter be.

What, then, are the discoveries made by the man of science in his dark room concerning the Sun of nature, all marvellous and sublime as they may be, but emblems, and faint emblems, of these Divine revelations made by a beam from the Sun of Righteousness? If those fill the philosopher with wonder and delight, these ravish the souls of saints and transport even the angels of heaven with joy unspeakable and full of glory!

"O Christ, the Lamb of God! Thou my all:
My theme, my inspiration, and my crown;
My strength in age, my rise in low estate,
My soul's ambition, pleasure, wealth; my world;
My light in darkness, and my life in death;
My boast through time, bliss through eternity—
Eternity too short to speak thy praise,
Or fathom thy profound of love to man—
To man of men the meanest, e'en to me.
My Sacrifice! my God!—what things are these!"

## ANALOGY VIII.

*As each color in the Sunbeam has its complemental color, and the observance of this relation in nature lends to it its highest charms—so each doctrine of the Sun of Righteousness has its complemental doctrine, while all are so related as to form a harmonious system of truth and grace.*

### Phenomena.

No feature in the system of Creation, perhaps, is more remarkable than the fewness and the simplicity of the means employed to accomplish great and various ends. Man's first conceptions of nature, in all her departments,

have been in general of a very intricate character; and the progress of Natural Science with scarce an exception has been from the more complex to the more simple. The earlier theory of the heavenly bodies, for example, was one of wonderful complexity; to account for the apparent progressive and retrogressive motions of the planets, crystalline sphere revolving within crystalline sphere to the number of nearly one hundred had to be imagined, and none but keen and logical minds were capable of taking in the theory which Hipparchus and Ptolemy with infinite ingenuity had propounded. But study and more correct knowledge reduced all this to a simplicity that a child can comprehend. So with the forces of nature; these were long supposed to be a legion, but the investigation of later times greatly reduced their number; and the science of to-day has come to regard all forces as simply modifications of *one* general force. The materials composing the solid globe, likewise, were wont to be accounted as well-nigh innumerable; but the scrutiny and analysis of the present day has brought them down to a comparatively small number. The same statement may be made in regard to the vegetable productions of the globe; these, exhibiting as they do in their individual forms, odors and flavors an endless variety, yet are found to be all composed of a few essential elements. And the living tenants of our world, though numbering from least to greatest so many millions, and differing so widely in their sizes and forms, places of habitation, and modes of existence, are all discovered to be formed on a few general systems of structure.

What is thus true of science in general is true of that particular branch of it, Light and Colors, with which we are now concerned. Newton, as has already been stated,*

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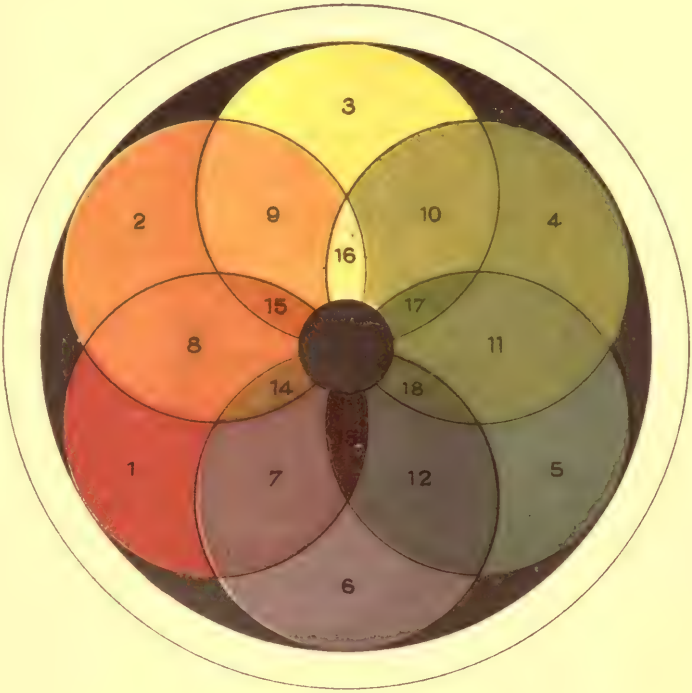
*See Part II., Analogy 2.

held that there were *seven* simple primitive colors—red, orange, yellow, green, blue, indigo and violet. And this was long regarded as an established theory; at length, however, there came forward minds that conceived the idea that this might not be in harmony with the general simplicity of nature's economy. By careful and repeated experiments, Ray, Field, Brewster and others were led to a different conclusion, and reduced the primitive colors to *three* only—yellow, red and blue. The proof of this new theory lies in the fact that, as the combination of Newton's seven prismatic colors produced white light, so the combination of these three will produce white light. Hence it is regarded as certain that yellow, red and blue contain all the shades of color embraced in the pure sunbeam.

These three PRIMARY COLORS have been proved by Field, in the most satisfactory manner, to be in numerical proportional power as follows,—yellow *three*, red *five*, and blue *eight*. When these three colors are reflected from any opaque body in these proportions *white* is produced. The absence of them all is *black*.

The three Primary Colors, mixed together, two and two, produce what are called SECONDARY COLORS, viz., red and yellow mixed give orange; yellow and blue mixed give green; and red and blue mixed give purple. The hue and tint of all these Secondaries will be varied according to the proportion in which the Primaries are combined.

Again: from combinations of the Secondaries are produced three TERTIARY COLORS; orange and green combined produce citrine; green and purple combined produce olive; and orange and purple combined produce russet. And as before, the proportions in which the Secondaries are mixed will vary the hue or tint of the Tertiaries.




| | | |
|---|---|---|
| 1. RED | 7 RED PURPLE | 13 DARK PURPLE |
| 2. ORANGE | 8 RED ORANGE | 14. RUSSET |
| 3. YELLOW | 9 YELLOW ORANGE | 15 DARK ORANGE |
| 4 GREEN | 10 YELLOW GREEN | 16. CITRINE |
| 5. BLUE | 11 BLUE GREEN | 17. DARK GREEN |
| 6. PURPLE | 12. BLUE PURPLE | 18. OLIVE |

In this way all the shades and hues and tints of colors in existence are produced from the three Primary Colors —yellow, red and blue.

In the language of science, any two colors are said to be *Complemental* to each other when they together make up the white beam. Thus red and green (the latter being a composite of yellow and blue) are complemental, because the two combined make white. So also purple and yellow, orange and blue, are respectively complemental. This is a fact to be specially noticed and remembered in the study of colors.

The sensibilities of the organ of vision are constituted with special reference to the combination and association of colors. Hence Infinite Wisdom ordained that those colors which are most agreeable to the eye should be the most prevalent in nature—the soft *blue* which overspreads the skies and the seas, and the refreshing *green* which clothes the face of all the dry land. Moreover, the eye experiences a special pleasure in contemplating complemental colors side by side, or under its view at the same time. Complemental colors, while they are always in harmony, yet beautifully contrast with each other, each enhancing the pleasure which the other imparts. Where colors that are not complemental come in contact, the impression upon the eye is not pleasing; a sense of disharmony is produced, though the observer may not be aware of the cause. An intervening streak of black or white, which are in harmony with all colors, removes this unpleasantness; and such a streak is often introduced in the colorings of nature, apparently for this very end; and man, catching at the lesson, now, when he finds it necessary, employs the same means of relief in his works of art.

In that able and interesting work, *Typical Forms and*

*Special Ends in Creation*, the following diagram is employed for the purpose of showing at a glance what colors are complemental to each other. "In this figure," says the author, "we have the three Primary colors, red and yellow and blue; and the three Secondaries, orange and green and purple, with the hues of the Secondaries on either side. We have also the tertiaries, citrine and olive and russet. The diagram is so constructed that the colors in corresponding segments of opposite circles are complementary, and so in harmony. Thus, red and green, blue and orange, yellow and purple, are complementary. According to the hue of any particular Secondary, so is also the hue of its complement. Thus, a pure purple requires a yellow, but a red purple requires a yellow green, and a blue purple a yellow orange, as the complementary color; and so of all other Secondaries. The Tertiary citrine is in harmony with a dark purple, olive with a dark orange, and russet with a dark green."

These facts in regard to the complemental nature and harmonious blending of colors, though always and everywhere displayed in the face of nature, have but recently been recognized and turned to practical purposes by man. It is by the study of the laws observed by the Creator in arraying the flowers of the field, the plumage of birds, and the leaves of the forest, that the artist has been enabled to attain his highest excellencies in painting the landscape, constructing his stained windows, and producing his finest tapestry.

The common idea, however, even to this day, is, that colors in the scenes and objects of nature follow no laws, but are scattered indiscriminately over the face of the earth. This is a wide mistake; amid the greatest seeming irregularities, the scientific eye can discover the observance of fixed rules. Plan and system are clearly discern-

ible in the arrangement of the infinitely diversified colors that prevail throughout both the vegetable and animal worlds. Harmony, beautiful harmony often appears in the way in which *differing* plants are associated in nature. Man, in his cultivated fields, sometimes brings together inharmonious colors; but in nature's own fields, the expansive prairies and wild mountain sides, where she is allowed to sow her own seed and raise her own plants, she commonly distributes her colors in a manner most graceful and pleasing. But it is when we come to examine the finish of the individual plant that we discover the laws of coloring in their perfection. In the flower, be it of whatever sort it may, every spot occupies its proper place; and every tint, every shade, every hue, that beautifies it, is in pleasing accordance with all that is associated with it. We never find non-complemental or inharmonious colors in contact on the same plant, or in one and the same flower. The association of colors, throughout the floral world, is in strict conformity to the most beautiful laws; and he who can contemplate nature in the light of these laws, has opened up to him a source of never-ceasing gratification arising from harmonies and accordances which are lost or unknown to the uninstructed mind. In illustration of all this we now direct the reader's attention to a few familiar examples.

As has been stated, and as may be seen in the preceding figure, *Red is the complemental color of Green.* These two are ever in pleasing harmony. Now, wherever in nature the flower is red, it associates agreeably with the green leaves around it. How beautiful and how pleasing to the eye the blushing rose, the crimson cherry and the red berries of the mountain ash, peeping forth from among the tufts of dark green leaves around them! So delicate are the adjustments of nature, that it has been observed,

that according to the *hue* of the green so is the *hue* of the red associated with it.

By reference to the diagram, it will also be seen, that *Yellow is the complemental of Purple.* These, like the former, are always harmonious. It is well known that purple is the most common color of the petals of flowers; and in beautiful contrast with this we find that to the centre of the flower has been given a yellow color. In the polyanthus, and in many varieties of auricula, the outer rim of the corolla is purple, and the circle within is of a corresponding shade of yellow. In other flowers the complemental yellow is found in the anthers or pollen. Indeed, as the most frequent color of petals is purple, so the most common color of the pollen is yellow. And, as before, it is a striking fact that, according to the hue of the purple, so is the associated hue of the yellow.

Again: *Blue is the complemental of Orange.* These, likewise, we find in pleasing harmony wherever they come together in the system of vegetation with which our globe is adorned. In the class of flowers named Strelitzia, the sepals are orange and the petals are blue; in the Lupines the reddish-blue petals are associated with the reddish-yellow anthers; and in the cheerful little Forget-me-not, we have a border of blue purple and a centre of yellow orange.

Into the details and minutiæ of this part of the subject our plan will not allow us to enter: suffice it to say that, these beautiful harmonies are found in plants belonging to all the principal divisions of the vegetable kingdom, and that they pass through a cycle of pleasing variations corresponding to the cycle of the seasons of the year.

In making up a bouquet, or grouping flowers in a garden, the most beautiful and pleasing effects are secured

by following the unerring rules of nature. "The principal rule to be observed in the arrangement of flowers," says Chevreul, "is to place the blue next the orange, and the violet next the yellow, while red and pink flowers are never seen to greater advantage than when surrounded by verdure and by white flowers; the latter may also be advantageously dispersed among groups formed of blue and orange, and of violet and yellow flowers." And all this is precisely the order followed by nature throughout her domains.

The harmony of colors, thus observable in the floral world, students of nature find to prevail also in the plumage of birds, in the variegated coats of insects, and even in the shells of mollusca.

"Surrounded as we are by such harmonies," says Dr. McCosh, "we are convinced that whenever the mind seeks for them it will discover them; nay, the eye fixes on them when it is not designedly seeking for them, and rejoices in them when it can give no account of the cause of its joy. At the same time, the contemplative intellect experiences a further pleasure, and a pleasure of its own, when it can scientifically explain to itself the source of all this enjoyment, and systematically look out for the pleasing associations of nature.

"The heart, rightly tuned to the praise of its MAKER, will experience a further pleasure. Present to a skilful colorist an article of human workmanship, constructed according to the rules of simultaneous contrast in coloring, and he will at once say, Here are art and design. Place before him a piece of Gobelin tapestry, one of our finer carpets, or the stained glass of a window, and he will perceive at a glance that the associations of color are not accidental, but that they are purposely suited to the physiological and psychical nature in man. We are

convinced that there are equally clear proofs of *contrivance* in the coloring of natural objects, organic and inorganic. Complementary colors appear so often in nature, and come up under such different modifications, and in such a variety of objects and situations, that their conjunction cannot be the result of chance. He who can trace up all these adaptations to Him who causes His works to make sweet music by their harmony, has surely here a source of higher—we should say rather, of highest joy."

In the Book of Psalms it is written: "The Lord shall rejoice in his works;" and from the lesson which the Lord of angels and men reads to us from the flowers of the field, we may be sure that he had often bent over them in devout admiration, and contemplated their beauty with infinite delight; for none but one whose attention had been in this way arrested and impressed could have thus spoken:—"Consider the lilies of the field, how they grow; they toil not, neither do they spin: and yet I say unto you, that even Solomon in all his glory was not arrayed like one of these. Wherefore if God so clothe the grass of the field, which to-day is, and to-morrow is cast into the oven, shall he not much more clothe you, O ye of little faith?"

## Teachings.

Pleasing and instructive as it is thus to trace the agency of light amid the objects and scenes of the world of matter, much more so is it to contemplate the light of Divine Truth, which it so beautifully typifies, in its operations in the world of mind. In the Sun's light, whose combined and associated colors so enliven and adorn the globe upon which we dwell, we have a most interesting emblem and illustration of the light of the Sun of Righteousness, whose beams illumine and animate the immortal spirits

of mankind. As every individual object and every expanded scene which the earth presents to the eye of man owes its coloring and its grandeur to the light of the Sun, so every inspiring truth and every happy prospect which opens up to the view of his faith, is due to the light of the Sun of Righteousness.

We have seen that the light of the Sun of nature is constituted of three primary colors, and that from these are composed every other shade and hue and tint of color that diversify the face of nature. The light which the Sun of Righteousness shed upon the world, likewise, is composed of three primary truths or doctrines—the *Sinfulness of man*, the *Atonement of the cross*, and the *Grace of the Spirit;* and from these three fundamental doctrines spring all the other doctrines of the Bible. For examples, from the atonement, in its relation to sin, spring the doctrines of justification by faith and the forgiveness of sin; from the grace of the Spirit affecting the sinful nature of man spring the doctrines of the new birth and the sanctification of the soul; from the love displayed in the death of the cross and the grace manifested in the gift of the Spirit proceed the doctrines of holy obedience and entire consecration to the service of God. So every other doctrine and duty set forth in the Gospel; like the colors of nature, all have their origin in, and derive their life and complexion from, these three primary and fundamental truths.

If we combine the three primary colors of the sunbeam, as therein found, we shall have pure white light; but if we take more of one or less of another than we find there, the combination will not yield white light, but something of a more or less dark shade. So with the light of the Sun of Righteousness; if we take and unite the three fundamental doctrines, as they proceeded from him, we

shall have what may be appropriately represented by *pure white light*, that is, a perfect and harmonious system of truth. But if we bring together defective or exaggerated views of either of these—of human depravity and Christ's atonement, or of the agency of man and the office of the Spirit, as is often done in human creeds—we shall have before us a system of belief that is neither harmonious in its parts, nor cheering in its aspect. Error in a man's view of any one of these three great and primary truths will give a corresponding tinge to his view of every other Gospel truth and duty. Wise and happy is he who is willing to receive, and content to abide by, the simple but unerring teachings of Jesus.

The face of nature may be regarded as a magnificent picture, in which all its figures and beauties are displayed on a ground of soft and refreshing green; so in the Holy Scriptures, the coloring which underlies all its doctrines and precepts, warnings and encouragements, promises and prospects, is that of the green pasture of mercy and grace. This meets and delights the eye whithersoever it turns, whether to the revelations of the prophets, the narratives of the evangelists, or the letters of the apostles. Grateful should we be that the face of nature is not clothed in one gloomy black, or glaring white, or crimson red; for how weary to the mind, and how painful to the eye would all this be: but oh! how much more thankful that the messages of God come not to us inscribed on the dazzling ground of justice, or on the flaming face of vengeance, but on the sweet verdure of a Father's love!

In the fields of nature, as has been stated, colors are distributed and associated according to the beautiful laws of complemental harmony; and the same holds true in the fields of scripture. The truths of the Bible and the facts of nature, the grace of God and the necessities of

man, are in mutual adaptation and perfect correspondence throughout. If we examine the promises of God, which, like fragrant and beauteous flowers, are scattered and waving over the fair face of the Gospel Field, we shall find them all complemental to human wants, and all harmonious with one another. Associated with every need of man we discover the most fitting provision of grace—encompassing his *weakness* we see bright promises of *Divine help;* overarching his *sins* we behold inscribed, as in the colors of the bow of peace, assurances of God's readiness to *forgive;* side by side with his *errors* and *ignorance*, like the alternate dark and white petals of the flower, we discover promises of heavenly *light* and *guidance;* encircling his native *frailty*, as the pure white lily-cup its trembling anthera, we find assurances of the *Divine compassion;* and for the *refreshing* of his soul, as the crystal drops do the bending rose, we see ready to descend the *dews of heavenly grace.* Delightful as are the agencies of the Sun of nature, and pleasing as are the beauties with which it clothes the flowers of the field, infinitely more so are the benignant influences of the Sun of Righteousness, and the harmony of the dispensations of his grace.

The laws of colors teach us, that when two colors that are complemental to each other, as red and green, or blue and orange, or yellow and purple, are placed side by side, they mutually heighten the effect of each other; each makes each more intense and appear to the highest advantage. Similar effects attend the collocation of the doctrines of the Gospel of Christ. Under no circumstances does the doctrine of justification by grace appear so precious as when placed beside a state of condemnation by the law. In no connection does the doctrine of regeneration through the Spirit appear so delightful and cheering as when placed beside the native depravity and

corruption of man. And the atonement, which, in a sense, is the complement of our fallen nature, presenting to Divine Justice all *that* of which we are destitute, and meeting all the demands of the law which we could not do—where does *this* appear so resplendent with the Divine Mercy and Love, as when viewed beside the rebellion, ingratitude and sin, for which it was made. O, it is the contemplation of these, in contrast, that imparts their highest inspiration to the anthems of heaven. Hear that song loud as the voice of many waters—"Unto him that loved us, and washed us from our sins in his own blood, and hath made us kings and priests unto God and his Father, to him be glory and dominion, for ever and ever. Amen."

## ANALOGY IX.

*While the Sun sheds the same light on the face of all nature, yet different objects reflect different rays of that light, and thus appear in various colors—so, while the Sun of Righteousness bestows the same light of truth on all, yet different individuals reflect that truth under different phases, and thus exhibit a variety of characters.*

### Phenomena.

Of the numberless contrivances and adaptations observable in creation, that have a direct reference to the welfare of man, the *colorings of nature* hold an eminent rank. It is impossible to estimate the number or magnitude of the benefits which we daily derive from colors—mere colors; and no serious man can intelligently contemplate the means which the all-wise Creator has employed to produce those colors, in all their variety, without being filled with wonder, and inspired with sentiments of devotion.

In the preceding analogies, we have stated, and at some length illustrated the fact, that all colors have their origin in the white light of the Sun. Yet this alone does not explain, or fully account for the endless variety of coloring which diversifies the general scenery and distinguishes the particular objects embraced within it. The particular color of a substance depends upon a certain relationship between its molecular constitution and the waves of light.

Apart from light all bodies or substances are without color; that is, are what we call *black*. There is no color generated by any object or material whatever. But the various substances and productions of nature are so constituted in their ultimate particles or molecules as to be capable of reflecting such and such rays only of the sunlight that fall on them; and the color of these reflected rays is the color of the object which thus throws them back upon the eye. Natural bodies do not inherently possess their respective colors, much less create them; they simply sift the colors that are in the sunlight, reflecting a part of them, and absorbing or quenching all the rest. Hence it will be observed that it is the portion of light which they reject, and not that which they absorb, that gives to objects their colors. A geranium is *red* because its molecular texture is such that it reflects the red rays only, while it absorbs or quenches all the rest; and a violet is *blue* because its molecular constitution is such that it sends back to the eye the blue rays only, while it absorbs all the yellow and red constituents of the light.

To render these statements more clear and convincing, let us resort to an experiment. A perfectly black substance is a substance that is incapable of reflecting any of the Sun's rays. Take a piece of coal, and pass it

successively through Newton's seven prismatic colors, and it is still perfectly black under every one of them; it reflects not a varying tint as it is carried from one extremity of the spectrum to the other. Take again the red petal of the rose; the molecular constitution of this is such, that it can reflect rays of a certain color only, namely, red; to prove this, pass it like the piece of coal through the seven colors, and it appears black as jet under every one of them except the red; this alone it has power to reflect. Take now a green leaf fresh from the tree, and pass it slowly through the spectrum as before; in the green rays it shines vividly with its own proper color; but under each of the remaining colors it is black as the lump of coal, because it has no power to reflect any of them. Thus it plainly appears that natural objects acquire their respective colors by a constitutional provision, whereby they sift the colors combined in the pure white light of the Sun, and absorb part and reflect the remainder to the eye.

These interesting facts may be beautifully illustrated by another experiment. Enter a perfectly close and compact room into which light can pass only through a single aperture, say a foot square. Now completely cover this aperture with a pane of clear crown glass, and the room is filled with pure white light, for this medium is such that it admits all the rays to pass freely through it. Remove this, and cover the opening in like manner with a pane of red glass, and the room is now filled with red light; and the reason is that the molecular texture of this glass is such that it entirely extinguishes the two other primary colors, blue and yellow.* Remove this again, and substitute for it a pane of blue glass, and the room is at once filled with blue light; because, as before,

*See the next preceding Analogy.

the molecular constitution of this quenches the remaining primary colors, red and yellow. Now take the red glass and lay it over the blue in the aperture; and what will then be the color of the light in the room? A mixture of red and blue light? No such thing, but perfect darkness. And the reason of this is obvious,—the rays which pass through the one are quenched by the other. The red glass quenches all other colors, including the yellow; and the blue does the same, including the yellow. Each pane of glass by itself is quite transparent, but by uniting the red and blue, therefore, we have a combination as dark as pitch to the solar light.

It plainly appears, then, that all objects, all substances, acquire their respective colors in virtue of their molecular constitution. The white light of the Sun, the sum total of all possible colors, is showered down upon them, and they, by the condition of the ultimate particles which compose them, sift that total, and reflect the rays which give to them their particular colors, while they quench all the rest. An object that appears green has its molecules conditioned to reflect green rays; that which appears yellow, to reflect yellow rays; that which appears purple, to reflect purple rays; and so of all other colors. This arrangement, by which all nature is robed in the charms of her varied hues, embraces many things that are beyond the research and even the comprehension of man; yet it is an arrangement of the utmost importance to his welfare and happiness.

To describe all the advantages and all the pleasures we daily and hourly derive from the diversified colors of natural scenes and objects would be to write volumes upon volumes. The evidence of this can be best presented, in brief, perhaps, by glancing at what our condition would be were all objects suddenly to fade into one

color or shade. It is difficult to realize, even in imagination, how altered our condition would be in such an event —what pleasures and conveniences we should lose, what disadvantages and dreariness we should inherit. The glories of the landscape, the verdure of the fields, the beauties of the garden, the charms of the human countenance, and the variegation of human garments would vanish and delight us no more. The pleasures of vision all would be extinguished. And more serious evils still than all these would inevitably follow. Were the productions and substances of nature without distinctive colors, or were the same unvaried hue spread over the face of creation, we should be in a thousand instances unable to distinguish one object from another. Looking abroad, we should be unable to distinguish the arid desert from the fruitful plain, the projecting rocks from human habitations, the flocks and herds from the pasture upon which they fed. We should stand ever and anon in doubt whether an adjacent field had just been furrowed by the plough, or bore a crop ready for the sickle; whether the tree were loaded with fruit, or clothed only with leaves; whether the person coming to meet us on the street was an officer in his uniform or a farmer in his Sunday suit, a bride in her ornaments or a widow in her weeds. Such would have been the monotonous and dubious aspect of nature, and such the inconveniences to which we would have been subjected, if objects had not been constituted to reflect different rays, and thus to wear distinctive colors. We could neither identify nor distinguish objects save by close examination, or by slow trains of reasoning concerning times, places, and circumstances; and after all this we should still remain in perpetual uncertainty as to many things concerning which we are now well assured by a glance. Add to all this, that the arts of printing,

painting and dyeing, under such circumstances, would have been impossibilities. Pictures on canvas, or pictures on paper, could have no existence. It would have been impracticable to communicate our thoughts by writing. We could neither impart nor receive instruction through the medium of books; and consequently should have been as ignorant of the history of our world as we are of that of the planets; and what is infinitely more important, would have been without a written Revelation from heaven to direct us in the path that leads to happiness and rest.

But as the world is now constituted, all these evils and inconveniences are escaped, and unnumbered advantages and pleasures secured. Individual objects and classes of objects are distinguished, and instantly recognized, by the colors they wear. The shepherd can discern his sheep and the herdsman his cattle as they graze on the distant hillside, or are scattered over the receding plain. The fruit on the tree and the crop in the field can be distinguished as soon as the eye alights upon them. Thoughts and desires can be written, science and history can be printed, likenesses can be photographed, and landscapes painted in all their varied hues. Yea, more—through this beneficent arrangement of Creative Wisdom, the whole face of nature, instead of presenting an aspect of dull uniformity, is invested with living charms, with associations and combinations of colors that everywhere arrest the eye and delight the heart. "On all sides we behold a rich variety of beauty and magnificence. Here spread the wide plains and fertile fields, adorned with fruits and verdure; there the hills rise in gentle slopes, and the mountains rear their snowy tops to the clouds, distilling from their sides the brooks and rivers, which enliven and fertilize the plains through which they flow.

Here the blue lake stretches into a smooth expanse in the bosom of the mountains; there the rivers meander through the forests and the flowery meadows, diversifying the rural scene, and distributing health and fertility in their train. Here we behold the rugged cliffs and the stately port of the forest; there we are charmed with the verdure of the meads, the enamel of the flowers, the azure of the sky, and the gay coloring of the morning and evening clouds." Thus colors overspread all nature with exquisite beauty and charm, and minister to our convenience, our tastes and our happiness, in a thousand different ways.

And here, it will be both interesting and profitable to glance at the complexity of contrivances and the web of adaptations to which the benevolence of the Creator has resorted in order that we might enjoy all these pleasures and advantages. We have, in the first place, in the *solar light* an agent of exceeding complexity, composed of innumerable constituents, embracing every possible shade and tint of colors, and these refrangible in as many different degrees. We have, in the second place, the *atoms and molecules* of organized bodies and inanimate substances gifted with the power of sifting the solar light in the most various ways, and producing by this sifting the colors observed in nature and employed in art; and to do this they must possess a molecular structure commensurate in complexity with that of light itself. In the third place, we have the *human eye*, an instrument, as we have seen in a preceding analogy,* of a highly complicated structure and of the most exquisite adjustment of parts, in order to collect the rays and receive their impressions. And lastly, we have the *brain*, an organ possessing a refinement of sensibility and action

* Part II., Analogy 4.

past all description, to distinguish the impressions thus generated in the eye. Here, then, are brought together four distinct agencies, each of extreme complexity, yet all, with infinite skill, so mutually adapted and related to each other, as to minister to us the inestimable advantages and all the undefinable pleasures of light and color. Could Divine intelligence and Divine benevolence possibly be manifested more clearly than we have them in these wonderful arrangements? A "fool," indeed, must he be, who saith in his heart, "There is no God."

## Teachings.

As material bodies and substances, in the manner just described, do by natural constitution reflect different rays of the sunlight, and thus appear in various colors; *so Christian people by native endowment reflect different rays of the Sun of Righteousness, and thus exhibit various phases of character.* And this diversity of gifts in the church is no less interesting and important than the variety of colors in nature.

Variety appears to be a general law in creation. Nature rarely, if ever, repeats herself. Neither the surface of the ocean, nor the clouds of the firmament, nor the face of the dry land, has presented exactly the same aspect on any two days since the date of their creation. And both the animal and vegetable kingdoms are in ceaseless permutation, and exhibit endless diversities. Every individual of each species of plant and animal differs in some respects from every other individual of the same species. No two birds, no two beasts, no two fishes can be found, when minutely examined, that are precisely of the same size, form, weight and color. And no two trees, no two leaves even, in all the forest, are alike in all respects. Equally true is this of human beings;

if we stand from morning till evening in the thronged and busy street, and mark the stream of pedestrians moving along, we shall discover that every individual on whom our eye falls differs from every other individual either in form, or stature, or features, or complexion. And if their souls or mental beings were visible, we should witness quite as great, if not even greater variety among them. We should see some of lofty and some of humble intellect; some enriched with poetic genius or musical talents, others devoid of both and well-nigh dull and slow as the ox that treadeth the furrow; some endowed with gifts that eminently qualified them to be divines, others to be lawyers, others to be generals, others to be statesmen, and others still to be manufacturers, or merchants or bankers; some possessing ingenuity that specially fits them for the mechanic arts, and others having minds and memories that qualify them for literary pursuits; some inheriting indomitable fortitude and courage, others exhibiting pitiable irresolution and timidity; some frank, generous, noble, others jealous, selfish and grovelling;—in short, we should observe as great a diversity in the mental furniture of human beings as we see of tints and colors, hues and shades in the productions and substances of material nature.

Now, as in the kingdom of nature so in the kingdom of grace, men being thus variously constituted, when the Sun of Righteousness arises upon them, they variously reflect his light. Though all that become true Christians are made new creatures, yet they are not all made alike in every respect. The change effected by grace is not made in our physical frame or mental faculties, but in our moral nature. Those who have been regenerated by the Holy Ghost are still of the same natural faculties, the same intellectual grade, and of the same distinctive char-

acter as individuals. The vigorous in intellect are vigorous still, and the more feeble in intellect are more feeble still. Hence Christian men and women reflect the Divine light they receive variously, according to their various natural endowments. For example, the four Evangelists were men of distinctive natural characters, and we find that each of the Gospel narratives, while faithful and true, still clearly bears the tinge of the mind in which it was cast; and the same is true of the Epistles and their respective authors.

Peter, John, and Paul, in their unrenewed and natural state, were men of very dissimilar minds and temperaments; and this dissimilarity continued to mark them even after they had become subjects of renewing grace; and we find that through all their after years their reflection of Divine truth differed in a corresponding manner. In Peter, as an *apostle*, we have still the impulsive and energetic fisherman of Galilee, a man that is quick, bold, and sometimes even rash; he is the first to recognize in his Master "the Christ," and the foremost to draw his sword and risk everything in his defence. In John, as an apostle, we have still the gentle son of Zebedee, a man mild, contemplative, and loving, and of inward adoration that rises above all forms, and is affected by neither time nor place—the chosen friend of the living Jesus. And in Paul, as an apostle, we have still the clear-minded, penetrating, and earnest disciple of Gamaliel, a man of intellectual vigor, untiring energy, and unconquerable decision and courage; a man who, from the depth and power of his convictions, attempts everything, *does* everything possible to humanity: sacrificing every self-interest to carry the Gospel to Jews and Greeks and Romans, to Barbarians, Scythians, Bond and Free; preaching in synagogues, theatres, and market

places; gathering Christian bands, and organizing Christian societies; writing epistles for the edification of churches, and for the guidance of bishops; reasoning with cavilling Scribes and Pharisees; confuting the proud conceits of Stoics and Epicureans; asserting the sacred rights of freedom at the hands of chief-captains and deputies; and declaiming before a Felix, a Festus, and an Agrippa, with an eloquence more powerful than that "which fulmined over Greece, and shook the throne of Macedon."

Thus each of these distinguished disciples reflected the light of the Sun of Righteousness according to his own *mental hue*, that is, according to his own natural gifts and personal temperament. In Peter, we have the *Apostle of boldness and earnestness;* in John, the *Apostle of love and serene devotion;* and in Paul, the *Apostle of progress and conquest.* And as we contemplate these three types of the apostolate, together or in contrast, like the three primary colors, each enhances the excellences of the others, while all combined present a harmonious and beautiful picture of the earnest, devout, and progressive spirit of Christianity.

What is true of these leading and characteristic spirits was equally true of the primitive church in general. While all its true and living members were under the influence and guidance of the Spirit of all grace, yet, as the apostle informs us, there were "diversities of gifts," and, as a consequence, also "diversities of operations" among them. Every talent was employed in activity of its own complexion. Some reflected the light of truth more especially as "teachers," some as "helps," some as "governments," others as "interpreters of tongues," and others still as "men of faith and prayer."

It need hardly be said that this was in accordance

with the Divine plan and instructions. The different talents and qualifications bestowed upon us as men, are designed by the Great Master to be exercised by us as Christians, for the recovery of the world and the building up of his church. He has distributed his gifts to the children of men, not alike, not equally, but according to his own wisdom and purpose for the common good, and he commands and expects "every man to profit withal." And the Christian, the true and living Christian, if endowed with the talents of a Luther, or a Knox, will, like these, reflect the light in its power and purity for the preservation of the faith once delivered to the saints. If he has received the gifts of a Wesley or a Whitefield, like them he will reflect the light as a preacher of the way of life. If blessed with the spirit and faith of a Martyn, a Judson, or a Livingston, he will, like these servants of the Most High, reflect the healing beams of the Sun of Righteousness as a missionary to those who sit in darkness, and in the region and shadow of death. If he is possessed of the poetic genius of a Watts or a Cowper, like these sweet singers of Israel, he will reflect the truth in psalms and hymns, and spiritual songs. If he has received the inspiration of a Beethoven, or a Mozart, or a Handel, he will reflect the truth in sacred tunes and anthems of devotion. If he has been endowed with intellectual power and penetration resembling those of a Newton, or a Herschel, or a Faraday, he will reflect the light as a sacred philosopher, exhibiting the power, and wisdom, and goodness of the Great Creator in the manifold works of his hands. If to him has been given the business capacity and success of a Peabody or a Stewart, he will reflect the light by the free donation of his accumulated wealth to instruct the ignorant, to relieve the needy and suffering, and to save those that are ready

to perish. Or, if he has been entrusted only with the poor man's portion, he will still, if he can do nothing more, reflect the light by contributing even of his little for the good of others, remembering that his mite, like that of the widow in the Gospel, may, by the blessing of God, continue to do good in the world while the Bible shall be read, or the Sun endure. And when the church of Christ, in all its membership, shall thus, according to the purpose of its Divine Head, reflect the light according to its varied gifts and talents, it will present a moral scene that can be compared only to the garden of the Lord, where all that could delight the eye, gratify the taste, and charm the heart were spread out before the beholder.

We have seen that to every body and substance in nature has been given the molecular constitution that will invest it in the color it was designed to wear, and that most important ends were to be secured by this arrangement. So to every man has been given the talents or qualifications by which it was purposed he should more especially reflect the light of the Sun of Righteousness, and most effectually promote the interests of his kingdom. "Every man," we are told, "has his proper gift." As, therefore, every talent is the gift of God, depending, perhaps, upon the mere molecular texture which he has imparted to the brain, no one has just grounds to exalt himself above his fellows on account of his superior natural abilities. Superior talents simply make him a greater debtor; and why should a man be proud of being deeper in debt than another? Or, to adopt the words of the apostle, "Who maketh thee to differ from another? and what hast thou that thou didst not receive? Now if thou didst receive it, why dost thou glory, as if thou hadst not received it?" It is the wisdom and duty, then, of all

to serve and honor God in the diligent exercise of the abilities which he has bestowed upon them, neither despising nor envying one another. The sunflower should not pride itself because it can lift its head above the violet, nor the violet despise the sunflower because it can send forth sweeter fragrance. The lily should not repine because it cannot bloom like the rose, and the rose should not be discontent because it cannot appear in the whiteness of the lily. It is God that hath given to every flower its own form and hue and odor; and shall the thing formed say unto him, "Why hast thou made me thus?" Nay, rather, "By the grace of God I am what I am." Neither great usefulness, nor great happiness always depends upon great talents. A little flower discovered by Dr. Kane growing and reflecting its pale hues beneath the cold lip of Humboldt's Glacier, in the polar region, affected and delighted his heart more than the most gorgeous flower-garden he had ever visited in his own happy land. And the sight of a bright bud just peeping above the burning sands of Africa, animated the expiring Mungo Park to make the one more and last effort that saved his life. Whether, therefore, we be sunflowers or violets, roses or lilies, geraniums or anemones, let us be thankful for the gifts we possess, and content to shine on in the colors which God has given us.

"Who does the best his circumstance allows,
Does well, acts nobly—angels could do no more."—*Young.*

## ANALOGY X.

*As the Sun of nature effects the illumination of the earth through the reflective agency of the atmosphere upon which its rays fall—so the Sun of Righteousness is to accomplish the illumination of the world of mankind through the reflective agency of those upon whom his light shines.*

### PHENOMENA.

THE globe which we inhabit, as all know, is encompassed by a vast ocean of aeriform matter, or atmosphere. This atmosphere rises to the height of many miles above its surface, but continually diminishes in density as the elevation increases. At the height of three and a half miles its density is only one-half as great as at the level of the sea; at the height of forty miles it is reduced to extreme tenuity, being less than in the exhausted receiver of the best air-pump; but where it terminates, or vanishes altogether, it is impossible to determine with accuracy.

In the course of the foregoing analogies we have had occasion to notice many of the wonderful adaptations and important offices of this atmospheric ocean, as the medium in which all the vital processes of both plants and animals are carried on, and in which all human activity has its seat; and in the present analogy we shall consider another of its beneficent functions, namely, its co-operation with the sunbeams in the illumination of the face of nature.

The agency of the atmosphere in enlightening the world is but little thought of, because but little understood, by men in general. The common idea is, that we owe the light of day simply and solely to the Sun. This impression, however, is not altogether correct. The Sun might exist and be all that it now is, a majestic and glorious luminary; and the earth, too, might be all that

it now is as to matter and form and motions; yet, without the atmosphere, the surface of our world would never be cheered with what we call *daylight*, nor charmed with the beauty of the varying tints and softening shades that now invest it. It is the reflective and dispersive powers of the atmosphere that convert the sunlight into daylight. Without the atmosphere, the sunlight would descend in direct and parallel rays of unbearable heat and brilliancy, illuminating and scorching those parts or objects upon which they directly fell, but leaving all other parts and objects in the darkness of night. That side of a mountain ridge, for example, upon which the beams of the morning Sun fell directly, would be heated and brightly illumined; but these beams, glancing in straight lines over its summit, would leave the opposite side involved in all the cold and gloom of midnight darkness. The same would be true of our dwellings and all similar objects. These evils and inconveniences are now avoided by the reflection and re-reflection of the solar rays by the atmosphere as they pass through it. The atmosphere is so constituted that its every particle, illumined by the sunbeam, becomes itself a new centre of emission, radiating the light in every direction; and it is through this co-operative agency of the atmosphere that the light proceeding from the Sun effects the general and complete illumination of the whole diversified face of nature.

What the condition and aspect of our world would be without an atmosphere is thus graphically described by the learned author of *Benedicite:* "The Sun is the great fountain of light; but without the co-operation of the atmosphere to diffuse it over objects, the illumination of this earth would have been most imperfect, and light could never have become the universal blessing which it now is. Objects on which the direct rays of the Sun fell

would, of course, have reflected light and been visible; but objects which were in the shade, and which, therefore, did not receive any direct solar rays, would have been invisible. Let any one attempt to realize the confusion into which the world would thus have been thrown. Even in the brightest sunshine we should have seen things only in broken fragments. The varied beauty of scenery would have vanished, and every landscape would have been disfigured with seams and patches of inky blackness. The rays of the Sun in passing through a window would have brightened the surfaces they touched, but all around would have been left in almost midnight darkness. In conversing with a friend, the side which was turned toward the Sun would alone have been visible; and, if our own face had happened to be opposite to his and in shade, he could not have seen it. If a cloud had passed over the Sun, both of us would have vanished into darkness, as if from a sudden eclipse. The azure tints of the firmament would have disappeared, and the stars would have shone at midday from a vault of utter blackness. To improve the illumination, it was, therefore, essential that something should distribute the light, so as to supply objects that were in shade with a certain amount of rays, by the reflection of which they might be seen. This task was given by the Creator to the atmosphere. Many of the Sun's rays fall directly on the earth, but the rest are caught up by the air, and are reflected and re-reflected from one particle to another, and are scattered and diffused in every direction, until all objects within their influence are bathed in light. In this manner bodies in shade are illumined and become visible by reflecting into our eyes more or less of the light they have received at second hand."

Now all this, let it be observed, is not to be regarded

as mere theory, but *fact*, established by the unquestionable principles of the science of optics. Moreover actual experience and observation confirm it. Such effects have been many times actually observed on the summits of high mountains where the air is greatly rarefied. On the top of Mount Blanc the sky is black, the stars are seen at noon, and even the milky way appears as a pure flame stretching across the heavens. The glare of the direct light is unbearable to the eye, and even the reflection from the snow blisters the unprotected skin, while the contrast between light and shade, being unnaturally increased, gives to surrounding objects a peculiar and ghastly aspect. All this results from a certain amount of diminution in the density of the atmosphere. It is obvious, therefore, that a greater reduction still of its density would produce more marked and startling effects even than these, and that the utter annihilation of the atmosphere would more than realize all that we have just attempted to describe.

In further proof of this interesting fact we direct the reader's attention to another scene. The Moon is a world without an atmosphere, and the aspect of her surface, as seen through powerful telescopes, plainly shows what that of our own would be without its aerial envelope. A distinguished astronomer describes that portion of the Moon's phase called *Mare Imbrium*, in the following terms: "Casting our eyes around us, what do we see? A boundless desert, stretching away as far as the eye can reach on every side, save one or two points, where a chain of lofty mountains can be perceived, whose brilliantly-pointed summits, glittering up in the sunbeams, just appear on the distant horizon. The light and heat are of a tropical fierceness, and there is not a cloud afloat to shield us. An infinite number of pits of

all depths and diameters are scattered over the plain. Above, the sky is black, out of which the Sun gleams like a red-hot ball; and the stars sparkle like diamonds, for no atmosphere such as ours exists, to give by its refractive and reflective powers the delicious blue to its heavens, and the softened shade to its landscape. The lights and shades are indented upon its features deep and dark, or intensely bright; no softening away in the distance; no gentle and beautiful perspective; no lovely twilight morning or evening stealing over or away from the scene. All the shadows are abrupt and sudden; all the outlines sharp, clear; objects appearing startlingly near even when really distant. No sound follows our footfall, or is ever heard in that silent place, for there is no atmosphere to conduct it; no fresh breeze blows upon its mountain tops, sighs through its burning deserts, rustles through brilliant green forests, or waves over grassy meadows; the silence of death broods over its arid wastes and rocky shores, against which no tides or billows break."

Something similar to this would be the condition and aspect of our own globe but for the wonderful and beneficent offices which the atmosphere performs. The atmosphere is the great diffuser of light and sound, as also of heat and moisture, over the whole face of our beautiful world. To the atmosphere we owe our ever-recurring daylight, with all its innumerable advantages and pleasures. To the atmosphere we are indebted for the pleasing illumination of the interior of our dwellings, and that they are not dark as dungeons when the Sun is on the meridian. To its repeated reflections and dispersions we owe the pure azure of the vaulted skies; the delicate contrasts of light and shade which beautify the scenery; the clearness of the foreground in the landscape, the gray

ASPECT OF THE MOON'S SURFACE.

of the middle distance, and the soft purple of the remoter hills, all blending in one harmonious whole. To the atmosphere we are indebted for the gorgeous coloring of the clouds, their varying hues of gold and purple, and their glittering towers and pinnacles of marble whiteness, which attend the rising and setting of the Sun. And when that "lord of day" has set and retired from view, to the atmosphere we still owe the tempered loveliness of the evening and morning twilight, the season for calm devotion, and "the time for poets made."

In the constitution of the atmosphere, then, we discover clear evidences of *design* and beneficent *adaptations.* We have just seen what important and startling effects are produced by a change simply in the density of this medium. Now this density depends upon four conditions, namely, the inherent nature of the air itself, the intensity of the earth's gravity, the total quantity of the air, and its temperature. Any change in either of these would produce a corresponding change in the density of the atmosphere, and consequently in the condition of our whole world. If the gases which compose it had been of a heavier or lighter nature, the atmosphere might have been of an oppressive density, or of an intolerable rarity. If the size of the globe had been different, or the materials that compose it much heavier or much lighter, so as to increase or diminish its gravitation, similar results would follow. If the total amount of air around the earth had been augmented or reduced, its density at the earth's surface would also be increased or diminished in the same proportion. Or, lastly, if the temperature of the atmosphere, which depends upon the distance at which we have been set from the Sun, were changed, its density would vary accordingly. Thus we see that if any one of these four conditions had been overlooked or ne-

glected, the present happy condition of things could not have been secured, and man, as now constituted, could not have lived on this globe.

The mutual and harmonious adaptation of all these mighty arrangements clearly proves unity of design, and this unity of design proves the oneness of the Designer. He who meted out the heaven with a span also weighed the dust of the earth in a balance, in order to invest it with an atmosphere of proper density and dimensions. He who created the rays of the Sun also so constituted that atmosphere as to reflect and disperse them to make daylight. He who formed the light also constructed the eye to perceive it, and to use and enjoy its advantages. He who breathed forth the circumambient air also wove the texture of the lungs with their myriad cells to inhale and exhale it. He who gave to the air its elasticity also made the ear to receive and appreciate its vibrations. And thus "that which may be known of God is manifest in men, for he hath showed it to them; for the invisible things of Him, from the creation of the world, are clearly seen, being understood by the things that are made, even his eternal power and godhead."

## Teachings.

The blessed Creator has not only adapted the atmosphere to the organs of our bodies, and to the wants of our physical nature, but likewise constituted it a scene of inspiring beauty and a volume of highest instruction to our minds. From the great offices which it fulfils in the economy of nature, we may learn the sacred duties which he has enjoined upon us, and which we owe to our fellow-creatures around us. As the Sun of nature, in the way now described, effects the illumination of the earth through the reflective agency of the atmos-

phere upon which its rays fall, *so the Sun of Righteousness is to accomplish the illumination of the world of mankind through the reflective agency of those upon whom His light shines.*

Like the solar orb, the Sun of Righteousness shed his rays *directly* on but a portion of the earth's surface, the hills and valleys of Judea. The rest of the world beheld not his glory, but remained in its darkness. The field of his personal ministry, from first to last, was limited to the province of Judea; his gracious messages and instructions all were addressed to the dwellers of that land exclusively. But the light of Divine truth which he brought into the world was not to remain confined within these narrow bounds; it was designed for the benefit of the race, the whole race of man. And, as in the kingdom of nature, so in his spiritual kingdom, there was to be a *medium* for the dispersion of that light. He designed and appointed those upon whom his life-giving beams first fell to become reflectors and disseminators of his light; and those who, in this way, received it, to become in like manner reflectors and dispersers of it to others still; and thus onward until the whole world should be illumined and enjoy the light of perfect day.

This medium, this living agency for spreading the light of truth, is described in the Gospel under a variety of figures, but it will serve our purpose to glance at one only of these. "Ye are the light of the world," said Jesus to his disciples; "let your light so shine before men, that they may see your good works, and glorify your Father which is in heaven." Of this the obvious import is—The design of your calling and enlightenment is not your own advantage only, but that of others also. The light you have received you are to impart to those who are still in darkness, as you yourselves once were. A candle

is not lighted for its own sake, nor to be put under a bushel, but to be placed on a candlestick, that it may give light to all that are in the house. So you are to shine as lights in the world, holding forth the word of life. It is my design and my appointment that my disciples, my people all, should constitute a living atmosphere, encircling the globe, and creating daylight throughout all its habitable parts.

Christians, then, are appointed to be a medium of reflection in the moral world as the atmosphere is in the material. As a matter of fact, man is constituted both to reflect the light that is in him, and to receive impressions from the reflection of others. Every individual has the power of reflecting the light of the Sun upon the sensitized plate of the photographer, so as to impress his own image thereon; and a true and faithful *likeness* is that image—outlines and features are perfect; wrinkles and scars, freckles and hair are all there; and even what may escape the eye in the original may be detected in the picture. A few years since, a lady was photographed at Berlin, whose complexion appeared spotlessly fair; but to the surprise of the artist, her portrait exhibited specks all over the face. Twenty-four hours after, the lady sickened of the small-pox, and the specks, which the day before were invisible, became then quite apparent. Nay, so true and faithful is this impress of reflection, that a man's mood or frame of mind, whether vivacity or listlessness, joy or grief, vexation or ennui, is clearly expressed in the picture thus produced. The same holds true in regard to the reflection and imprint of a man's character. Every individual has his particular degree and shade of moral or immoral light, and this he continually reflects upon men around him; and these, like sensitized plates, are constituted with a natural susceptibility to receive

impressions from that light, whether good or evil. That which a man *is*, in belief and taste and temper and habit, manifested in what he does and does not, is effective in its tendency, and is ever photographing itself, more or less clearly, on other minds. He may be unmindful and even altogether unconscious of the influence he is thus exerting, but the fact, nevertheless, is certain. If the pure light is in him, it must shine; or, if darkness reigns within, it must shade; if he glows with love, it will radiate its warmth; if he is immersed in vice, it will spread its stain. Nor is it possible for any man to divest himself of this inherent element of influence. No man can live without reflecting his light and leaving his impressions upon those among whom he moves.

Nothing, therefore, should concern a man more than that the light which he reflects should be pure, and the impressions he makes be for good. Hence the Saviour's command to his followers is, that they reflect *his* light, the pure light of heavenly truth which he bestows. Now the Christian is a man who has received this light; it shines perpetually within his soul, and diffuses its purifying, cheering influence over all the faculties and affections of his being, producing holiness and peace and love. Nor is this all: so subtle and penetrating is this heavenly light that, though dwelling within, it pervades the whole man, and, as it were, renders his whole exterior luminous, and invests his whole conduct with holy radiance. Integrity and truth, purity and love, benevolence and devotion, mark all his ways. And thus his light so shines before men that they see his good works, and are led to glorify their Father which is in heaven.

The human mind, we have said, is constituted with a natural susceptibility to impression from the light reflected upon it; and this susceptibility is found in its

greatest refinement in the young. Hence the reflection of parents upon the tender and sensitive minds of their children makes the most influential and lasting impression. And herein lies a fact of profoundest interest to every father and mother—a fact that should daily stand before their eyes as in blazing sunbeams—but a fact, alas! overlooked and forgotten by thousands. How many a parent seems more concerned about the appearances that strike the outward eye, than about the spirit and temper which affect the inward mind. How many speak and act among their children as if this idea had never dawned upon their minds. There is a young mother—mark her; she is on her way to the gallery to have her likeness taken. Soon we see her seated beneath the softened light opposite the artist's instrument. After numerous adjustments and repeated inspections, she is at length ready. The attitude of the head, the expression of the features, the turn of the eyes, the position of the arms, the extension of the fingers, and even the folds of the dress, have all been subjects of careful study. And all this painstaking arrangement of her person has been made, as she says, "in order to appear just as she wishes to be seen always in the picture by her family and friends." Yes, that mother is very desirous to produce a pleasing photograph of herself. But is she aware, does she realize, that she is every day, at home, photographing her likeness upon the immortal minds of her children, plates infinitely more delicate to receive, and infinitely more durable to retain, not her form and features only, but her very temper and spirit—her whole living character? Is she there as much on her guard against hasty words, petulant handling and a ruffled temper, as she is here now against a knit brow, a clenched hand, or a ruffled lace? Is she as studious that the inef-

faceable impress she makes upon her little ones be as graceful, serene, and faultless as the one she now wishes to produce? If it be a mother's or a father's eye that is tracing these lines, let them be assured that this representation is not fiction or a figure, but a fact. This mental photography is actually going on every day. Let them see to it that their light shall always so shine before their children, that, seeing their good works, they may be led to glorify their Father which is in heaven.

But to return to the general application of these words: the Christian, *whatever* be his relation or position in life, is required to reflect both in his conduct and spirit the light he has received. He is bound by his obligations both to his Divine Master, the fountain of truth, and to his fellow-men, to make the truth known for the salvation of others. In his character, as "the light of the world," he must reflect that light before all around him. This is the express vocation of every disciple. As every particle of the atmosphere, as soon as illumined by the sunbeam, becomes itself a new centre of emission, radiating the light in every direction, so every unit or individual in the body of believers, the moment he receives the light of the Sun of Righteousness, is to become a reflector and radiator of that light. He is to exhibit the Gospel in its practical meaning and transforming power. He is to become a living epistle that may be seen and read of all men. For this end has he been called out of darkness into the light which he enjoys, and for this end he is preserved and continued in the world.

And it is not by example only that the disciple of Jesus is to reflect the light; he is also to do it by active and zealous efforts, by all the means in his power or at his command, by his tongue and his pen and his worldly

substance. To give the light to those who are beyond the reach of his personal influence, he is to make cheerful and liberal sacrifices. He is to aid in sending missionaries, as reflectors, into the dark places of the earth. Thus runs the Master's high commission: "Freely ye have received, freely give: Go ye into all the world, and preach the Gospel to every creature." Go carry the light of life and the offers of love; go proclaim the fulness of Divine mercy and the freeness of my salvation; nor stop nor rest while there remains a human being who has yet to hear the sweet story of redeeming love. The professor of religion, who takes no part in this grand enterprise of illuminating the world, understands not his calling, and acts an anomalous and contradictory part. He seems to say by his conduct that the world does not need light, or that Christianity is no light, or that he himself has not its light and is no Christian. From this work no disciple of Jesus is exempt or released; nor, if true to his principles, would he be exempted or released.

Thus, by the Divine appointment, every disciple is to be a bright and burning torch, irradiating the circle in which he moves; every Christian church to be as a city set on a hill, whose light cannot be hid; every Christian isle as a Pharos, sending its gleaming beams far and wide over the dark waters that surround it; and the whole body of believers, over sea and land, by their several and combined lights, to constitute a luminous atmosphere that shall give to the whole world the clear light of day.

## ANALOGY XI.

*As the Sun of Nature, viewed through the dank vapors afloat in the atmosphere, appears discolored, and sometimes distorted—so the Sun of Righteousness, looked upon through the dark mists of the carnal mind, appears in a character that belongs not to him, and often as without form or comeliness that he should be desired.*

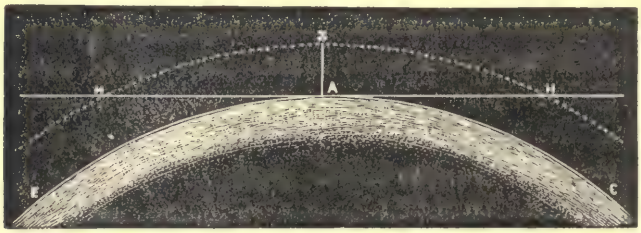
### PHENOMENA.

The atmosphere of our globe, as we have before observed, is composed mainly of two gases, oxygen and hydrogen, whose combination forms a perfectly transparent medium. In this medium, however, there floats at all times a vast quantity of aqueous vapor, raised daily by the heat of the Sun, in the form of steam, from the surface of the sea and of the dry land. The amount of water thus lifted into the air by the process of evaporation is very great, and far exceeds that discharged into the ocean, during the same length of time, by all the rivers of the earth.

The aqueous vapor produced in this manner is diffused through the whole body of the atmosphere, and is in a state of perpetual motion and change, being rarefied into an invisible condition, or condensed into mists and clouds, according to the varying degrees of heat or cold to which it is exposed; and in this way it affects, sometimes more and sometimes less, the general transparency of the air, and modifies both the colors and the forms of objects seen through it. And in the present chapter we are to speak of the various aspects which it gives to the Solar Orb.

The Sun, viewed through a vaporous atmosphere, appears in *false colors*. When the vapor is dry and rarefied, or in an invisible condition, the air is clear, and the Sun is seen in his natural brightness. But if the vapor be slightly condensed, and takes the form of mist, he appears through it as if shorn of his glories, a white orb,

upon which the eye can rest without pain or inconvenience; as he descends he grows still more dull; and finally, as he approaches the horizon, he gradually assumes a rosy tint, and at last a deep red color. These changes are thus explained. Every ray of the sunlight which comes to us has to pass through the whole thickness of the atmosphere, and the greater the distance it has to travel the greater the portion of it that is absorbed by the vapors in the air. And this distance, as is obvious, increases with the increased declination of the Sun. If we admit the atmosphere to extend vertically to the height of sixty-two miles, a ray of light coming from the Sun at the zenith has only these sixty-two miles to pass through in order to reach us, as from Z to A. But a ray




PASSAGE OF LIGHT THROUGH THE ATMOSPHERE.

from the Sun on the horizon has to travel through 706 miles, or more than eleven times the former distance, as from H to A, and that, too, through the densest portion of the atmosphere. In traversing this great distance, the various colors combined in the perfectly white ray, except the red, are for the most part absorbed by the slowly condensing vapors along the cooling surface of the earth. Hence the red color in which the Sun appears at its setting and rising.

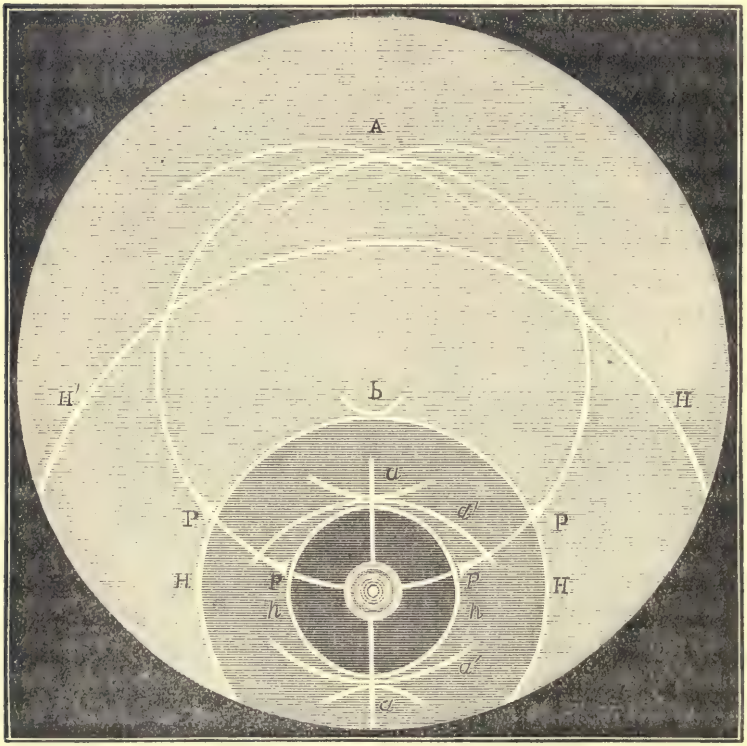
The Sun, viewed through a vaporous atmosphere, often appears, also, in a *false form*. Seen on the meridian, through a clear sky, he appears as a perfect circle, which

is his true outline. But as seen near the horizon, in certain conditions of the atmosphere, instead of being circular, he appears of an oval form, the upper and lower sides being flattened, and the latter more so than the former. On high mountains, and on plateaux near the seacoast, this flattening of the disc appears very considerable, amounting sometimes to one-fifth the apparent diameter of the Sun. This peculiar deformation is caused by the refraction or bending of the rays of light in passing through the vapors of the atmosphere. Sometimes the want of homogeneity in the successive layers of the atmosphere, caused by the unequal admixture of vapors, gives to the Sun an apparent form of so irregular a character that he is scarcely recognizable. A striking instance of this kind of distortion was observed by Biot and Mathieu, at Dunkerque, on the coast of France.

Again, the Sun, viewed through the atmospheric vapors, in a certain state, appears surrounded by *appendages which do not belong to him.* When the sky is hazy, and presents a dull, milky appearance, there is frequently to be seen around the Sun a colored circle, or halo, having a radius of 22°, and the Sun occupying the centre of the circle, as *h h*. The inner edge of the circle is colored red, and is well defined. The sky within the halo is much darker than it is for some distance without. Sometimes there may be seen around the Sun a second halo or colored circle, as H H, having a radius of 46°. The inner edge of this also is red, and tolerably well defined, while the outer edge is of a pale blue color, and but faintly marked. At rare intervals, a third halo, of 90° radius, as H′ H′, has been observed, surrounding the Sun. Unlike the other two halos, this one shows scarcely a trace of color. All these phenomena are produced by the refraction of the sunlight in passing through the mi-

nute crystals of frozen vapors floating in the atmosphere; these crystals being of various kinds and having their facets set at different inclinations to one another, refract the various colors of the sunrays at different angles, and thus produce halos of different diameters.

When a halo is formed around the Sun, there is often to




HALOS AND PARHELIA.

be seen a white circle passing through the Sun, and parallel to the horizon, as represented by A P P. This is called *parhelic* circle, and is produced like the foregoing by the reflection of the Sun's light from ice prisms or snow crystals, whose surfaces have a vertical position. At or near those points where halos cut the parhelic circle, there is a double cause of light; and here the illumination is sometimes

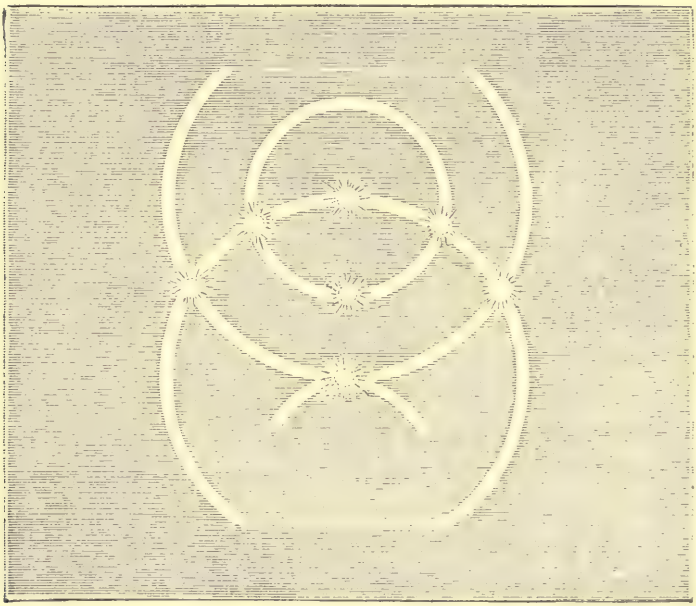
so great as to present the appearance of a mock-sun, and is called *parhelion.* The number of these mock-suns, or parhelia, visible at the same time, is variable; sometimes one or two only are to be seen, at other times four or five; on some occasions as many as seven have been observed at once. The mock-suns generally seem about the size of the true Sun, but not quite so bright, though occasionally they are said to rival their parent luminary in splendor. These beautiful phenomena appear most commonly in high latitudes, but often occur in the more temperate regions.

Parhelia have been observed frequently both in ancient and modern times. Aristotle records two appearances of these meteors, and Pliny mentions their occurrence at Rome. A double parhelion, which was noticed before the Christian era, is referred to by St. Augustine. Parhelia of various characters were observed in England in the years 346, 812, 593, 1199, 1233, 1236 and 1466. Many others have been observed from different points on the continent. On the 2d of January, 1586, Christopher Rotham saw, at Cassel, before sunrise, an upright column of light of the breadth of the Sun's disc. As he rose to view, he was preceded and followed by a parhelion, which appeared in contact with his orb, and continued visible for thirty minutes, and then were hidden by a cloud. On the 28th of February, 1551, mock-suns were seen at Antwerp; and on the 17th of March of the same year, a similar phenomenon, with two halos, was witnessed at the same place. Four days after the last named, two parhelia, with three halos, were seen at Magdeberg.

Scheiner witnessed a singular one at Rome, on the 20th of March, 1629. From the zenith as a centre there was seen a great white circle, having the true Sun in its circumference; this was intersected by two concentric cir-

cles around his disc. Where the outer of these smaller rings cut the zenithal circle, two parhelia appeared, and in the great circle, nearly opposite to these, but separated by a wider arc, two others were visible.

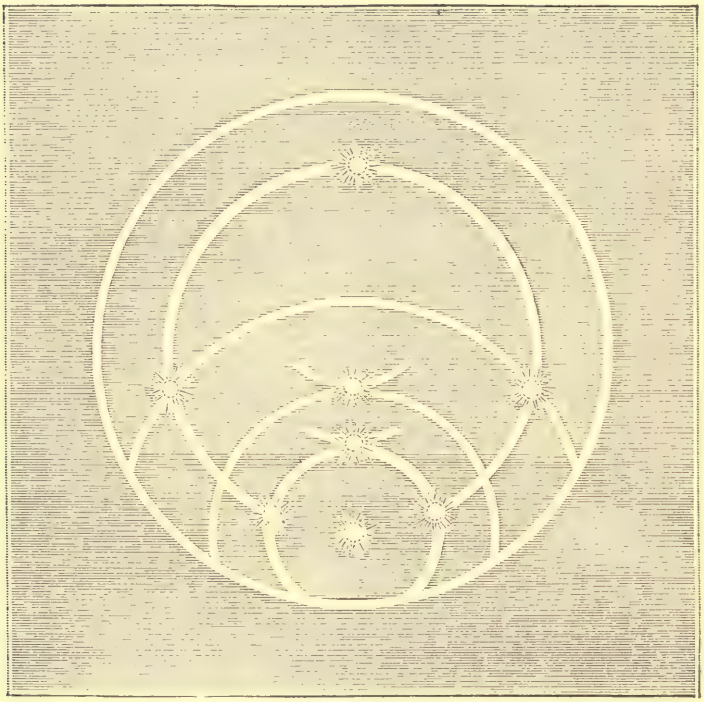
Gassendi describes a very remarkable instance of this phenomenon, which was seen in 1630. Around the Sun were two concentric halos: the larger cut the horizon, and consequently was incomplete; these were colored



PARHELIA OBSERVED BY GASSENDI.

like the rainbow, excepting that the red was internal. In the direction of the zenith, there was a tangental arc external to these halos; and with the zenith as a centre, a great white circle ran parallel with the horizon, having the true Sun in its circumference. At the five intersections of these circles and arcs parhelia appeared, and a sixth was seen in the internal halo between the true Sun and the zenith.

One of the finest meteors of this kind on record was seen by Hevelius, at Sedan, on the 20th of February, 1661. "A little before 11 o'clock," he says, "the Sun being towards the south, and the sky very clear, there appeared seven suns together, in several circles, some white and others colored, and these with very long tails



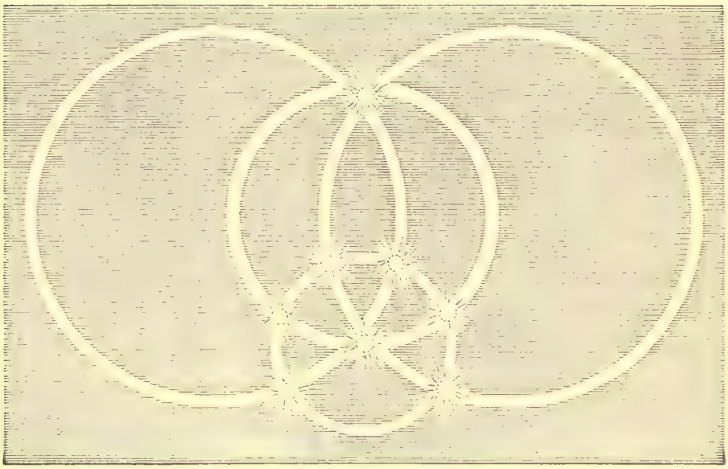
PARHELIA OBSERVED BY HEVELIUS.

waving and pointing from the true Sun, together with certain white arches crossing one another. The true Sun was about 25° high, and surrounded almost entirely by a circle whose diameter was 45°, and colored like a rainbow with purple, red and yellow, its under limb being scarcely 2½° above the horizon. On each side of the Sun, towards the west and east, there appeared two mock-suns, col-

ored, especially towards the Sun, with very long and splendid tails of a whitish color, terminating in a point. A far greater circle, almost 90° in diameter, encompassed the Sun and the former lesser circle, and extended itself down to the horizon. It was very strongly colored in its upper part, but was somewhat duller and fainter on each side. At the tops of these two circles were two inverted arcs, whose common centre lay in the zenith, and these were very bright and beautifully colored. The diameter of the lower arc was 90°, and that of the upper one was 45°. In the middle of the lower arc, where it coincided with the circle, there appeared another mock-sun, but its light and colors were dull and faintish. There appeared a circle much bigger than the former, of an uniform whitish color, parallel to the horizon, at the distance of 25°, and 130° in diameter, which arose as it were from the collateral mock-suns, and passed through three other parhelia, of an uniform whitish color like silver; one parhelion, almost 90° from the Sun, towards the east; another towards the west, and a third in the north, diametrically opposite to the true Sun, all of the same color and brightness. There passed also two other white arches of the greatest circle of the sphere through the eastern and western parhelia, and also through the pole of the ecliptic. They went down to the horizon, crossing the great white circle and obliquely, so as to make a white cross at each parhelion; so that seven suns appeared very plainly at the same time. This phenomenon, with certain changes in the brightness of its several parts, continued visible an hour and twenty minutes."

Such parhelia have been observed at various times and places in North America. Barker describes a curious halo with accompanying mock-suns, which he saw at Fort Gloucester, near Lake Superior. A circle with tan-

gental arc surrounded the Sun; about midway between the horizon and zenith, a circle ran parallel to the horizon, having the Sun in its circumference; in this horizontal circle, there appeared altogether five mock-suns, with this peculiarity, that, directly opposite the true Sun in this great circle, a St. Andrew's cross was seen, the upper limbs of which extended higher above, than the lower one descended below, this circle; in the intersection of this cross and the circle, one of the parhelia was placed.



PARHELIA OBSERVED IN TENNESSEE.

A very curious system of circles, with five mock-suns, appeared on the 19th of August, 1825, at Jackson, Tennessee.

An exceedingly curious optical appearance belonging to this class of phenomena, was observed by Mr. Fallows, on the 7th of May, 1823, at the Cape of Good Hope, when the Sun's disc was just dipping in the ocean. On either side of the true luminary, and within the breadth of a degree and a half of his disc, four mock-suns appeared on the left, and three on the right. They had

the same shape as the true Sun, touched the water at the same instant, and all of them disappeared together, shining as bright spots upon the water's edge. This magnificent scene occurred on a delightful evening, when not a cloud was to be seen.

Such are a few of the marvellous appendages which the vapors of the atmosphere sometimes create around the great luminary of the Day.

Now, evanescent as is the nature of all these meteoric phenomena at which we have glanced, and irregular as their occurrence may be, yet they are in no sense to be regarded as the result of chance. On the contrary, we see in them the play of exact and beautiful laws. All are produced according to the principles of order established, in the beginning, by the One Supreme Lawgiver. In all, brightness and shade prevail in their ordained degrees; and heat and cold produce their designed effects in sea and land and sky. The sunrays in their passage through visible mists, or viewless vapors, are reflected, refracted, and absorbed according to uniform rules. The diameters, distances and intersections of the encircling halos are all measured off after the undeviating principles of geometry. Every tint and shade in their coloring, and every facet and angle in the frozen particles that produce them, display the operations of the unerring laws of optics. Invisible vapors, icy crystals, luminous arches, colored halos, splendid parhelia—all proclaim the observance of law and order. And though the whole magnificent diorama may fade and vanish within the brief space of five minutes, yet, in its production, nothing has been slighted, nothing imperfectly formed, nothing left to be determined by chance.

## TEACHINGS.

But other lessons than those of mere Natural Theology are suggested to us by the subject of this chapter. As the solar orb, seen through the vapors afloat in the atmosphere, often appears discolored, and sometimes distorted, *so the Sun of Righteousness, viewed through the mists of the carnal mind, frequently appears in a false light, or in a character that does not belong to Him.*

The vapors and fogs that refract and absorb the light of the Sun, in passing through the atmosphere, are apt emblems of the disordered passions and earthly propensities of men, which pervert and obscure their moral vision. Seen through these, no spiritual fact or truth appears to them in its correct light, or in its right connections. "The natural man," saith the apostle, "receiveth not the things of the Spirit of God; for they are foolishness unto him; neither can he know them, because they are spiritually discerned."

When the Sun of Righteousness arose upon the Land of Promise, though it was as "God manifest in the flesh," as a Divine Man, fair and sinless and glorious, full of grace and truth, speaking as man never spake, and working miracles of benevolence such as man had never witnessed—yet, to the Jews, whose carnal mind was a perversive medium, he appeared in a very different light, and of a widely different character. Viewing him as through an atmosphere dank with pride, self-righteousness, lust, avarice and selfishness, they could see in him no beauty, no form or comeliness, that they should esteem or admire him. He was to them "as a root out of a dry ground." They "despised and rejected him;" yea, they "hid as it were their faces from him."

Nor were the Jews singular, or an exceptional case, in this respect. Carnal reason, in every age and in every

land, is a medium that ever exhibits Christ in a false color, or in a false character, or in a false position. Some can see in his life nothing more than that of a *man*, and in his death nothing more than that of a martyr; he is to them but another Socrates sacrificed to the rage of an excited multitude.

To others he appears as an *impostor*, who, by superior cunning, deceived the people. How perversive must be the mental atmosphere that can present the Great Teacher under such an aspect will appear by a glance at the admitted facts of his life. It is now universally acknowledged, not even an intelligent infidel dissenting, that he taught the purest system of morals, and lived the purest life, and crowned both with the noblest death, ever known among men. How then could he have been the very best of men, and, at the same time, the very worst—an impostor? The contradiction is as gross and absurd as that light is darkness and darkness is light. And what could have induced him to act the part of such a deceiver, when it must have been obvious to him, that poverty, hatred, persecution and death would be his certain reward? And how could he, if a hypocrite, maintain in act and speech, a character in perfect harmony with all his exalted teachings, amid every species of insult and treachery and abuse, without even for a moment, or in a single instance, falling out of his *rôle* and showing his true colors? How could such a scheme of wicked imposture produce greater and better results, as the world today acknowledges, than any which human wisdom and goodness before or since have been able to achieve? How monstrous, then, and how morally revolting the idea that Christ was an impostor! How dense and deceitful must be the atmosphere that can thus distort the form, absorb the light, and clothe in sackcloth the glorious Orb of Day!

Again, some are enveloped in such a haze of self-sufficiency and scholastic conceit, that they can discover in the Gospel narratives nothing more than a *mythical character*. Glorious myth! Who, we may be permitted to ask, was the author of this incomparable production? Who was the genius that portrayed this character which challenges and receives the admiration of the most enlightened and polished nations of the globe? Is it credible that the illiterate fishermen of Galilee could have invented a life and character far higher and more perfect than anything which the poets, or philosophers, or historians of Greece and Rome were ever able to produce or conceive? Such a supposition makes the writers of the myth more extraordinary characters than their hero. "It would take more than a Jesus," said Rousseau (himself an unbeliever) "to invent a Jesus." Add to all this absurdity, that of making a myth of a character and life that are found in complete harmony with every link of a long chain of undeniable predictions running back to the very gates of paradise, and that stand at a thousand points in acknowledged connection with the whole history of the centuries that followed. If the Gospel be a myth, then all records of the past must be a myth; the Pharisees who accused him, Herod who mocked him, and Pilate who crucified him, must all have been myths; and such must have been hundreds of others, whom all sane men have held to be real and living actors of that age. In what strange hallucinations, then, must those be involved who entertain this mythic notion! The atmosphere in its most abnormal condition never presented a more baseless illusion. Here is a veritable *fata morgana* of the mind. Of *that* natural phenomenon, an eye-witness gives this description: "For an extent of several miles along the coast of Sicily, I saw the sea assume the

appearance of a chain of gloomy mountains, while the waters in the direction of Calabria remained perfectly smooth. Above them was seen, in *chiaro-oscuro*, a range of many thousand pillars, all of equal height, and seemed to bend over and resolve themselves into arches and arcades like the old Roman aqueducts. Then a cornice formed along the top, and an endless number of castles, all alike, appeared. These presently faded away into towers that vanished also, leaving nothing visible but a long colonnade, succeeded in its turn by windows, and then by pines and cypresses, also indefinitely repeated." So the advocates of the Mythic Theory, after looking over the Gospel field a while, presently fancy they see its magnificent columns of truth, its overarching miracles of mercy, its colonnades of moral precepts, and its manifold adornments of Divine virtues—all change forms, gradually crumble into ruins, and finally fade away into a mere "myth." What a mental mirage!

Others still can see in the Divine Teacher nothing but an *enthusiast*, dreaming that he was the Son of God, self-deluded, and deluding those around him. We are told by physiologists, and all can verify the fact for themselves, that to gaze steadily at the unclouded Sun, soon exhausts the power of vision in the eye, so that when it is withdrawn and turned in another direction, all things appear of one color. So these, looking at the glorious Sun of Righteousness, seem to be dazed in a similar manner, and all they read in the Gospel appears to them to wear the hue of enthusiasm. But to a man of undimmed and clear sight, where are the evidences, where even the indications of enthusiasm? The narratives of the Evangelists, from first to last, exhibit not a trace of fanaticism or self-deception. On the contrary, we find Jesus of Nazareth "calm, self-possessed, uniformly consistent, free

from all passion and undue excitement, never desponding, ever confident of success even in the darkest hour of trial and persecution. To every perplexing question he quickly returned the wisest answer; he never erred in his judgment of men or things; from the beginning to the close of his public life, before friend and foe, before magistrate and people, in disputing with Pharisees and Sadducees, in addressing his disciples or the multitude, while standing before Pontius Pilate and Caiaphas, or suspended on the cross, he showed an unclouded intellect and complete mastery of appetite and passion —in short, all the qualities the very opposite to those which characterize persons laboring under self-delusion or any mental disease." If the uniform conduct of any man that ever lived be sufficient to defend him against the imputation of enthusiasm, then the life of Jesus, his temper and spirit, his converse and actions, place him at an infinite distance above such a charge.

As the Sun that, through the dense vapors lying along the horizon, appears pale or dull or red in color, or oval or irregular in figure, when seen through the clear sky on the meridian, is found to be a full-orbed and glorious luminary—so the Sun of Righteousness, though, viewed through the dank and darkening atmosphere of natural reason and earthly passions, he may seem to be an impostor, or an enthusiast, or a myth, yet, when seen through the clear light which Heaven has given, is discovered to be "the BRIGHTNESS of the Father's glory, and the express IMAGE of his person."

The latter class of aerial phenomena which we have described in this chapter suggests another interesting and instructive analogy. When the air cools and its vapory particles become frozen into clouds of minute crystals, then it is that the atmosphere encircles the Sun with

its halos and parhelia—appendages which form no part of it, neither are related to it. To all this we find a perfect parallel in the spiritual world. The Christian religion in its beginning was correct and true in its sentiments, pure and warm and holy in its spirit. But as time rolled on, over all this there gradually crept a sad and dismal change. Its doctrines became corrupted, and its spirit degenerated, by closer and closer association with the world. Its devotion became cold, and its worship crystallized into mere forms and ceremonies. And in process of time the Sun of Righteousness, like the Sun of nature, came to be presented to the world as surrounded by illusive appendages which belonged not to him, by fancied associates whom he disclaimed and repudiated. The Virgin Mary by degrees came to be regarded as a deified being, and to be worshipped under such titles as these—the Queen of Heaven—the Propitiation of the world—The Protectress from Divine Justice—The Ladder to Paradise—The Mediatrix of Grace—The Co-operator in our Justification—The Refuge of the Lost—The Way of Salvation.* And to her came to be addressed such devout petitions as the following:

*O Holy Mary! my Sovereign Queen and most Loving Mother! receive me under thy blessed patronage, and special protection, and into the bosom of thy mercy, this day, and every day, and at the hour of my death.*†

*O great, excellent and most glorious Lady, prostrate at the foot of thy throne, we adore thee from this valley of tears.*‡

*Hail! Holy Queen, Mother of Mercy, our life, our sweetness, and our Hope! To thee we cry, poor banished sons of Eve, to thee we send our sighs, mourning and weep-*

* See *Glories of Mary*, translated from the original, pub. in London, 1852.
† *The Catholic Manual*, p. 46. ‡ *Glories of Mary*, Am. Ed., p. 513.

*ing in this valley of tears. Turn, then, most gracious Advocate, thy eyes of mercy toward us!* *

After a similar manner, but somewhat later, came the Apostles and Martyrs also to be deified and adored. The worship of departed saints was introduced by degrees. "At first, annual festivals were instituted to their honor; the next step was praying in the cemeteries at their sepulchres; then their bodies were translated into churches; then a power of working miracles was attributed to their dead bodies, bones and other relics; then their wonder-working relics were conveyed from place to place and distributed among other churches; then they were invocated and adored for performing such miracles, for assisting men in their devotions, and interceding for them with God; and not only the churches, but even the fields and highways were filled with altars for invoking them."

Thus, as the religious atmosphere of the church lost its original transparency, and came to be filled with carnal vapors, cold and frozen, the Sun of Righteousness came to be represented as encompassed with halos of imaginary *Intercessors*, and surrounded with mock-suns of associated *Mediators*. Yes, and there are multitudes to-day who believe all this, and with the profoundest devotion address their prayers to them as such. But what are they, save the merest illusions, a species of mental *Anthelia*, or spectral shadows projected on the vaporous atmosphere of their inventors. In many parts of the world travellers have seen their shadows cast, upon a gigantic scale, on the bosom of a distant cloud, closely resembling their own forms and imitating all their motions. "What astonished us, among the Cordil-

* *Glories of Mary*, Am. Ed., p. 433.

leras," says Bouguer, "was that the head of the shadow was adorned with a halo, formed of three small concentric crowns of very vivid colors, resembling so many rainbows. This made a sort of Apotheosis of each of us. But while we were tranquilly enjoying the pleasure of seeing ourselves thus wearing these triple crowns, in a moment all faded and vanished away." Equally unreal and illusive are the crowns which superstition has placed on the heads of saints and martyrs to constitute them intercessors and mediators with Christ. The eternal word of truth proves and pronounces all to be but a phantasy.

As the atmospheric halos and parhelia have in themselves neither substance, nor light, nor heat, but owe all that they are to the light of the Sun; the moment he "shuts his glories in," that moment they utterly vanish; so these departed apostles and martyrs and the Virgin Mary, saints though they be, have no power or influence that they can exert in behalf of their deluded votaries; they themselves are as completely dependent on the Sun of Righteousness as any other sinners saved by grace. Let him but withdraw his saving and life-giving beams, and they can do nothing, are nothing. There is but "one mediator" between God and men, the man Christ Jesus. He is the way, the life and the truth. And there is no other name under heaven, given among men, whereby we can be saved.

## ANALOGY XII.

*As the Sun stands alone as a luminary, unrivaled in splendor by any orb of heaven—so Christ the Sun of Righteousness stands alone as a Teacher, unequalled and unapproached in the wisdom, purity and benevolence of his instructions.*

### PHENOMENA.

VARIOUS instruments have been invented, and various methods pursued, to measure the intensity of the Sun's light, and to estimate his power of illumination as compared with other sources of light, natural and artificial; and the results reached are full of interest and instruction.

Of the light-giving power of the Sun, two different and entirely distinct estimates may be made, namely, of his illuminating power, and of his intrinsic brilliancy. The distinction between these may be explained in few words. The *illuminating power* of the Sun is measured by the total amount of light which he imparts as compared with the total amount of light given out by another luminous body, without respect to their relative distance or dimensions. The *intrinsic brilliancy* of the Sun is estimated by the amount of light emitted by a square foot, or a square inch of his surface as compared with that emitted by a square foot, or a square inch of the surface of some other luminous body. Bearing this distinction in mind the statements that follow will be readily understood.

Several philosophers of the sixteenth and seventeenth centuries attempted to measure the intensity of the solar light, but it is to Bouguer first, and to Wollaston next after him, that we owe the earliest estimates possessing any tolerable degree of precision. The former, in 1725, calculated that the Sun at the zenith, with a clear sky, illuminates an object 75,200 times more than a candle placed at the distance of 34 feet from this object; the latter, in 1799, on the same basis, but by a different

method, made the number of candles somewhat less, namely, 68,000. Candles, however, were very inferior and inadequate objects for comparison in such a matter as this.

Since the days of these scientific worthies means have been discovered for producing artificial light of far greater intensity than any kind of candles that can be made. The Carcel lamp gives as much light as half a dozen stearic candles, and a fish-tail gas jet as twice that number. What is known as the Drummond Light, produced by directing the flame of a jet of mixed hydrogen and oxygen gas on a piece of lime, possesses an intensity equal to 180 candles.* A magnesium wire burnt in oxygen gas gives out a light of intrinsic brilliancy 500 times greater than that of a candle.† The electric light, obtained with a nitric acid battery, gives a degree of light equal to 1,000 candles.* But none of these approach the Sun in brightness; in fact, the most brilliant of them, placed in the Sun's light, by reason of his incomparably superior brightness, becomes actually invisible.

Sir John Herschel, speaking on this subject, says: "The most brilliant and beautiful light which can be artificially produced is that of a ball of quicklime kept violently hot by a flame of mixed ignited oxygen and hydrogen gases playing on its surface. Such a ball, if brought near enough to appear of the same size as the Sun does, can no more be looked at without hurt than the Sun—but if it be held between the eye and the Sun, and *both* so enfeebled by a dark glass as to allow of their being looked at together—it appears as a black spot on the Sun, or as the black outline of the moon in an eclipse, seen thrown upon it. It has been ascertained by experiments which I cannot now describe, that the brightness, the intrinsic splendor, of the surface of such a lime-ball

* Schellen's *Spectrum Analysis*, pp. 20, 34. † Guellemin's *Sun*, p. 25.

is only 146th part of that of the Sun's surface. That is to say, that the Sun gives out as much light as 146 balls of quicklime each the size of the Sun, and each heated over all its surface in the way I have described, which is the most intense heat we can raise, and in which platina melts like lead."*

In all the preceding comparisons the light of the Sun is spoken of, not in its native power and potency, but as it reaches us after having passed through all the layers of gases and vapors which compose our entire atmosphere. Now it has been estimated that, under the most favorable conditions of the atmosphere in the summer season, at least thirty per cent. of the solar light is absorbed before reaching the surface of the earth; and at our latitude, in the winter season, full one-half of his rays are thus spent. This, therefore, is a fact that greatly augments the significance of all the foregoing comparisons.

Leaving all artificial and all terrestrial sources of light, let us now direct our attention to a comparison of the solar light with that of other celestial luminaries, and first of the *Stars*. Astronomers have classified the fixed stars into such and such "magnitudes," according to their apparent brightness. The faintest stars visible to the naked eye are embraced in the 6th magnitude; those somewhat brighter in the 5th magnitude; and so on. Now taking the average brightness of a 6th magnitude star as *one*, or unity, the average brightness of the other classes, together with the Sun, will stand as follows:—

| | |
|---|---|
| 5th magnitude stars | 2 |
| 4th " " | 6 |
| 3d " " | 12 |
| 2d " " | 25 |
| 1st " " | 100 |
| Sirius (the brightest of all the stars) | 324 |
| The Sun | 6,480,000,000,000 |

* *Familiar Lectures on Scientific Subjects*, p. 66.

From the above figures, it is apparent, that the brightness of the Sun exceeds that of the brightest star by a difference that is practically infinite.

Let us again glance at the *planets*, which are so much nearer to us. Of these the most brilliant is Venus, that known and admired in all ages as "the bright and morning star." So dazzling in certain points of her orbit is this planet that, in the absence of the moon and on a clear night, she casts perceptible shadows of objects on the earth. Yet when the Sun arises, such is his superior effulgence, that her glories all are swallowed up in his, and she fades and vanishes completely out of view.

But of all the heavenly bodies, that which gives out the greatest amount of light to human eyes by night is our own *satellite*. This, at its fulness, creates a kind of soft daylight (so to speak) over the surface of the globe; yet the moon's light is found to be only $\frac{1}{547513}$ of the Sun's light. Hence, we should need the light of no less than 547,513 full moons to produce a daylight equal in brightness to that which the Sun gives. Now actual calculation shows that there would not be room for so many in the whole half of the sky which is above the horizon and visible to us, as the disc of the moon, when full, covers a space equal to $\frac{1}{110000}$ of it. From this it follows that the light from a sky fully and completely lined with full moons would not give us a daylight one-half as bright as that created by the Sun.

Such is the light of the Sun. No orb in the spacious firmament can be compared with him. Yea, the light of the moon and planets and all the stars of heaven combined would not equal, or even make the most distant approach to that which he daily pours forth over a hundred worlds. He stands alone in his glory, a monument to the praise of him who at first

kindled up his fires, and still sustains them in all their energies.

> "O! who can lift above a heedless look,
> While such bright scenes as these his thoughts engage;
> And doubt, while reading from so fair a book,
> That God's own finger traced the glowing page;
> Or deem the radiance of yon blue expanse,
> With all its starry hosts, the careless work of chance?"

## TEACHINGS.

Now, as the Sun of nature thus stands alone, as a luminary, unrivaled in splendor by any orb of heaven —*so the Sun of Righteousness stands alone as a Teacher, unequalled and unapproached in the wisdom, purity and benevolence of his doctrines* by any sage or philosopher the world has ever seen.

In the course of the earlier ages of the world's history, each of the great nations of antiquity—the Hindoos, Chinese, Persians, Arabians and Greeks—in their turn, had their wise men and great teachers. And as we cast our eyes over the receding firmament of the past, while multitudes of others, who were of lesser note, like the stars of the smaller magnitudes, have vanished out of view, these still shine conspicuously as stars of the first magnitude. But bright as they are, and admired as they have been, not one of them comes within the reach of comparison with the Divine Orb of Righteousness, the Teacher sent from God. To be assured of this we need but glance at their characters and their teachings.

The Hindoos had their MENU. Of all the systems of religion now extant in the world, the most ancient, doubtless, is that of this people; and of all their teachers, whose instructions have come down to us, Menu, who flourished about 900 B. C., stands among the most celebrated. The "Institutes of Menu" are the pride and boast of Brahmins. And there have not been wanting

in Christian lands, men who have presumed to place these Institutes side by side with the Laws of Moses, and even with the Gospel of Christ, by way of comparison. But these, for the most part, to say the least, have been individuals whose competency to form a correct opinion of that ancient work may reasonably be questioned. No scholar of modern times can be named whose judgment of these Institutes stands above that of their learned translator into English, the accomplished Sir William Jones, and who has given us his estimate of them in the following terms: "The work, now presented to the European world, contains abundance of curious matter, extremely interesting, both to speculative lawyers and antiquaries; with many beauties which need not be pointed out, and with many blemishes which cannot be justified or palliated. It is a system of despotism and priestcraft, both indeed limited by law, but artfully conspiring to give mutual support, though with mutual checks. It is filled with strange conceits in metaphysics and natural philosophy; with idle superstitions, and with a scheme of theology most obscurely figurative, and consequently liable to dangerous misconceptions. It abounds with minute and childish formalities, with ceremonies generally absurd, and often ridiculous. The punishments are partial and fanciful; for some crimes dreadfully cruel, and for others reprehensibly slight; and the very morals, though rigid enough on the whole, are, in one or two instances, as in the case of light oaths and pious perjury, unaccountably relaxed."* To this clear and comprehensive description of these celebrated *Institutes* nothing need be added to convince the reader of their infinite inferiority to the pure and divine code of religion and morals found in the Gospel; or to prove that to liken

* *Preface* to the *Institutes of Menu.*

their author to the author of the "Sermon on the Mount," would be to compare the fitful and delusive flashes of the aurora to the strong and steady light of the glorious orb of day.

The Chinese, likewise, have their national Sage. About 500 B. C., there appeared among that people a celebrated character, named KUNG-FUT-SI, or, as he is commonly called, CONFUCIUS. So highly venerated in China is this teacher that there are in that country at this day more than 1,500 temples dedicated to him, and more than 60,000 animals are annually immolated to his memory. Confucius spoke with the greatest reverence of the King of Heaven, as the Creator of all things; and labored to inspire men with becoming fear, reverence, gratitude and love toward him. He uttered many wise sayings, and established a number of ordinances and institutions that do honor to his name, especially considering the age in which he lived. Yet connected with all this appears a sad amount of darkness and error and human infirmity. Some of his ideas concerning the Supreme Being are most unworthy of Him; and his foremost precepts are but prudential maxims based on convenience or necessity. His whole system is devoid of motives that are calculated to elevate or ennoble the human mind, or to inspire men with a just appreciation of virtue or of vice. Judging his code of religion and morality by its fruits, but little can be said in its commendation; from the time of its promulgation to the present day, it has left the teeming millions of his country's population in the darkness and vices and degradation of *practical atheism*. Few contrasts can be named that are greater than that which exists between Confucianism and Christianity. The Gospel of Christ presents God in a character worthy the eternal admiration, confidence and love of all intelligent beings

—a God wise, holy, just, pure and merciful; in whom the intellect, the affections and the conscience of man may calmly and safely repose. His Gospel is a light that enlightens and elevates the world, and becomes the glory of all peoples that obey its dictates. Its precepts all are based in rectitude that commands the assent of reason and the approval of conscience. The motives it presents are the most powerful, and the prospects it reveals are the most inspiring that can move the heart or mind of man. And the fruits it has produced in the world—the enlightenment, civilization and refinement of the foremost nations of the globe; and the fruits it is continually producing among the most ignorant and degraded—taming the savage, abolishing the inhuman rites of the idolatrous, and establishing the pure, elevating and sanctifying worship of the only living and true God—present the most convincing demonstration of its Divine origin and supreme excellency.

The annals of Persia, also, have their great name, ZERDUSHT, or ZOROASTER, as he is most commonly called. This was the great patriarch of the Magi, who, according to Hyde, Prideaux, and many others of the learned, lived between the beginning of the reign of Cyrus and the latter end of that of Darius Hystaspes. His pretended revelations and his teachings have been preserved and handed down to us in a book entitled the *Zend Aresta*. A large amount, and the most valuable part of the ideas embraced in this work, have obviously, and by common consent, been taken from the Old Testament scriptures, and from sentiments that were prevalent among the Jews in his day; and after these have been extracted, there remains in the *Zend* little more than a congeries of puerilities, superstitions and absurdities; it contains scarcely a precept or a rite that has any tendency to elevate the

mind, or to raise man from his state of moral degradation even to the elevation of civilized society, not to speak of spiritual purity. To the moral precepts that were original with this sage the highest praise that can be ascribed is *harmlessness*. He professed and enjoined great regard for *animal life*, and that principally on account of its connection with the doctrine of metempsychosis, or the transmigration of souls, which occupied a very prominent place in his system of instruction. He also entertained and commanded great reverence for *fire*, as the emblem of the Divine purity. This is said to have taken its rise from the following occurrence: Having retired to a mountain for the study of wisdom and the benefit of solitude, Zoroaster, one day, found the whole mountain enveloped in flames around him, out of the midst of which he came out without receiving any injury; on which he immediately offered sacrifices to God, who he was persuaded had then appeared to him. Hence arose the Zoroastrian system of fire-worship, which in time came to be attended with a vast variety of ceremonies. In this Zerdusht, then, as a moral and religious teacher, we find nothing that is worthy, nothing that admits of comparison with Jesus of Nazareth.

But of all the nations of antiquity the Greeks produced the most celebrated as well as the greatest number of philosophers. Taking these in the order of their times, we are led to speak first of PYTHAGORAS, a native of Samos, who flourished about 500 years before Christ. This distinguished sage, in order to gather knowledge, is said to have travelled through Phœnicia, Egypt, Persia, and even as far as India. On his return, his fame for wisdom and sanctity spread rapidly far and wide, being helped forward by his marvellous and even supernatural pretensions. He is said to have exhibited a thigh, like the

shoulder of Pelops, all made of gold; to have fascinated an eagle as it flew over his head; to have tamed a Daunian bear, which had laid waste the country, by speaking a word; to have predicted not storms only, but earthquakes and future events; and to have been endowed by the gods with the power of preserving a distinct remembrance of many states of existence which his soul had passed through before it occupied his then present body. He went about clothed in a long white robe, with a flowing beard, and with a crown of gold upon his head, maintaining the utmost gravity and majesty of aspect among the people, never allowing his countenance to express grief, or joy, or anger. He refrained from the use of wine and from all animal food, and confined himself to a frugal vegetable diet. By these marvellous pretensions and this artificial demeanor, Pythagoras passed himself off upon the multitude as a being of an order superior to common humanity, and persuaded them that he had received his docrines all from heaven. In imparting his instructions, he followed two distinct systems, the one open and the other secret. To public assemblies he discoursed in praise of virtue and in condemnation of vice, and gave special lessons as to the duties of men in the several relations of life. To the body of his select disciples he imparted his instructions in private, enjoining under oath the most perfect silence and secrecy concerning what he taught them. During the years of their initiation into that society they were not allowed even to see their master, but listened to his lectures delivered from behind a curtain. If it happened that one grew weary of his restrictions, and withdrew from the society, a tomb was erected for him, as for a dead man, and he was to be, as such, forgotten by the brethren as if he had been actually dead. His disciples were to rise before the

Sun that they might pay him homage; and each day was begun with a distinct deliberation upon the manner in which it should be spent. With respect to God, Pythagoras appears to have taught, that he is the universal mind, diffused through all things, the source of all animal life, the proper and intrinsic cause of all motion, in substance similar to light, in nature like truth, the first principle of the universe, incapable of pain, invisible, incorruptible, and only to be comprehended by the mind. Cicero states that Pythagoras conceived God to be *a soul* pervading all nature, of which every human soul is a portion—which is nothing more than the modern system of Pantheism. His belief in the transmigration of souls led him to abstain from all animal food, and to exclude all animal sacrifices from religious services. His instructions to the select body of his disciples were for the most part delivered under the veil of certain symbolical expressions, of which Iamblichus gives the following examples: Adore the sound of the whispering wind. Stir not the fire with a sword. Turn aside from an edged tool. Pass not over a balance. Setting out on a journey, turn not back, for the Furies will return with you. Breed nothing that has crooked talons. Receive not a swallow into your house. Look not in a mirror by the light of a candle. At a sacrifice, pare not your nails. Eat not the heart or brain. Taste not that which has fallen from the table. Break not bread. Sleep not at noon. When it thunders, touch the earth. Pluck not a crown. Roast not that which has been boiled. Sail not on the ground. Plant not a palm. Breed a cock, but do not sacrifice it, for it is sacred to the Sun and moon. Plant melons in thy garden, but eat them not. Abstain from beans.—Many other particulars might be related concerning this celebrated philosopher, but enough

has been said, we are sure, to convince the reader, whether we contemplate his character as a man, his spirit as a public teacher, the nature of the doctrines he put forth, or the manner in which he communicated his instructions, that in all these respects he stands at an immeasurable distance below the Teacher of Galilee, who delivered the Sermon on the Mount, and spake the inimitable Parables, which at once astonished and delighted the listening multitudes that stood on the shore of the Sea of Tiberias.

The next great name, as a philosopher, which Greek history presents to us, is that of SOCRATES, who was born at Athens, B. C. 470. Though a heathen, and living in the midst of heathens, Socrates believed in one Supreme Being, in the immortality of the soul, and in the necessity of Divine influence to the practice of virtue and communion with the Deity. According to the unanimous testimony of those who knew him best, he was a sincere, upright, disinterested man, and withal, singularly pious according to the light he had. Xenophon tells us that he never undertook any work without first asking counsel of the gods. A sense of the Divine presence, a strong faith in the influence of God, and a deep desire to be governed by it, were habitual to his soul. While other Greek philosophers were occupied with a variety of ingenious theories, he endeavored to apply his great knowledge to good and practical purposes, esteeming it to be the true end of philosophy to make men not only wiser, but also more virtuous and happy. His sentiments and character, as brought forth in his defence against the charges of his enemies, that he was a corrupter of the youth, have never failed to command the admiration of all reflecting minds. "I pass my time," said he, "doing nothing but persuade you, both young and old, to care so

earnestly neither for the body, nor for treasures, nor for any other thing, as for the soul, by what means it may be ennobled in the highest degree. Oh, Athenians, I esteem and love you, but I shall obey God rather than you; and while I live, and as far as lies in me, I shall never cease philosophizing, or urging and remonstrating with whomsoever I may meet, in the very same terms I have been wont to use. I declare that the highest good to man is this, to spend every day in forming opinions respecting virtue and other subjects, such as you have heard me discussing, scrutinizing both myself and others, and that a life without inquiry is no life for man. You, therefore, oh my judges, ought to be hopeful in reference to death, and to keep in mind this one truth, that there is nothing evil to a good man, whether in life or in death, nor are the matters which concern him neglected by the gods. I am not at all incensed against those who have condemned, or those who have accused me. It would be ridiculous for a man, who during his life has habituated himself to live like one who was very near to death, to be afterward distressed when this event actually overtook him. Shall one who verily loves wisdom, and entertains the strong hope that he shall find that which deserves this name nowhere except in Hades, shall he, instead of rejoicing to depart, be afflicted at dying? Does not the soul of the wise and good depart to that which is congenial to its nature, to the unseen, the divine, the undying, the wise? Arriving there, its lot is to be blessed, to be emancipated from error and ignorance, and fears, and wild appetites, and all other earthly evils; and, as is said in reference to the initiated, truly does it spend the remainder of existence with the gods." During the interval which elapsed between the passing of his sentence and its execution, some of his wealthy

friends pressed him to take advantage of the means of escape which they could easily have procured for him. But he refused to prolong his life by a breach of the laws which he had never violated, and in defence of which he had before braved death. And when the fatal summons came, he received and drank the deadly cup of hemlock, in the midst of his weeping friends, with as much composure and as little regret as the last draught of a long and cheerful banquet.

Such is the brighter side of the character and teachings of Socrates; and it is with feelings of mingled sadness and regret that we now turn to look at the darker. Sublime as were many of the sentiments he uttered, and heroic as was the spirit he displayed, yet his mind was involved in grave errors concerning the very fundamentals of all religion—the *soul* and its proper *object of worship.* His reasonings concerning the soul of man were often more subtle than satisfactory; and the alternate hope and fear concerning its immortality, which not unfrequently became manifest in his teaching, not a little perplexed his disciples. He believed in the pre-existence of human souls, before their entrance into the bodies of the present race of men; and taught that they would enter and occupy other bodies still after the death of those they inhabit now—the souls of the wicked passing into the bodies of irrational animals as a punishment for their vices. He was, moreover, an avowed polytheist. Though he acknowledged One Supreme Being, yet he believed in other gods also, and devoutly worshipped them. He openly taught that a good man ought to worship the gods recognized by the country to which he belonged. His faith in a plurality of objects of worship was undisguised and sincere, for his dying request of a friend was, that an offering he had vowed to a heathen

deity might be paid for him. "Crito," said he with his last faltering breath, "we owe a cock to Æsculapius; discharge this vow for me, and do not forget it." These great errors in views and practice—errors that must have affected and modified all his teachings concerning the present duties and future hopes of men—sadly mar the instructions of Socrates, disfigure his character, and envelop his memory in a melancholy cloud. So that after all the admiration and eulogies bestowed upon this remarkable man—and justly bestowed—we find in him as a teacher of religion and duty, when compared with Jesus of Nazareth, but the moonbeams struggling through clouds and darkness as compared with the clear light of the noonday Sun.

Descending with the course of history but a short stage, we are brought to contemplate another notable Greek teacher, who rose to distinction and celebrity second to none of the sages of antiquity—PLATO, the disciple and ardent admirer of Socrates, a native of Athens, or Ægina, born 429 B. C. In ethics and religion the disciple and his master are entirely identified, and it would be idle to attempt to distinguish between them. The philosophy of Plato, however, differs from that of Socrates in its form, still more in its details, and especially in its completeness and refinement. The following is an outline of his system:—That there is one God, eternal, unchangeable, and immaterial, whose nature it is difficult to discover, and when discovered, impossible to divulge; that this great Being formed the universe out of a mass of matter that had been in existence from all eternity, to which he gave form and government; that there is in matter a necessary but blind and refractory force, which resists the will of the supreme Artificer, so that he cannot perfectly execute his designs; and this is the cause

of the mixture of good and evil which is found in the material world: that the soul of man was derived by emanation from God; but this emanation was not immediate, but through the intervention of the soul of the world, which was itself debased by some material admixture: that the relation which the human soul, in its original constitution, bears to matter, is the source of moral evil: that when God formed the universe, he separated from the soul of the world inferior souls, equal in number to the stars, and assigned to each its proper celestial abode: that these souls were sent down to earth to be imprisoned in mortal bodies; hence arose the depravity and misery to which human nature is liable: that all our knowledge is acquired by the reminiscence of ideas contemplated in a prior state: that the soul is immortal, and by disengaging itself from all animal passions, and rising above sensible objects to the contemplation of the world of intelligence, it may be prepared to return to its original habitation: that matter never suffers annihilation, but that the world will remain forever; and that by the action of its animating principle it accomplishes certain periods, within which everything returns to its ancient place and state; and this period is termed the Great Year. The moral precepts of Plato are greatly to be admired. He inculcates a patient endurance of calamities, a peaceful and forgiving disposition, and an elevation of the mind, directing itself to things honest and eternal. The end of all knowledge or philosophy, according to his views, is to make men resemble the Deity as much as is compatible with human nature; and this likeness consists in the possession and practice of all the moral virtues. Such were the doctrines and precepts of Plato.

This philosopher, like some others, travelled much for

observation and learning, and, among other countries, through Phœnicia and Palestine, seeking converse with the wise and learned wherever he came, and possibly with Nehemiah and Malachi, who were his contemporaries. He is generally supposed to have gathered many of his sublimest ideas concerning the Supreme Being from the Jews; indeed, he acknowledges that he received his best and chief divinity from the Phœnicians, by whom probably he meant the Hebrews. Clement, of Alexandria, styles him the "Hebrew Philosopher;" and both he and Eusebius speak of one Aristobulus, a Jew, who affirmed that Plato followed the Jewish institutions, and curiously examined the several parts thereof. Justin Martyr also says that he drew many things from the Hebrew fountain, especially his pious conceptions concerning God and his worship. Were all the ideas thus obtained, directly or indirectly, from the inspired scriptures of the Jews to be set aside, the writings of Plato would lose many of their brightest gems, and himself would be stripped of not a little of the honor which has been so liberally bestowed upon him. Still, of all the philosophers, he appears to have made the nearest approach to the principles of true wisdom.

The defects and errors of Plato's system are too many and too conspicuous to be overlooked. Often he assumes things without any sort of proof or evidence; and the way in which he expresses himself is frequently obscure, and sometimes enigmatical. The causes to which he ascribes the material and moral evils that are in the world, together with the account he offers of the origin of the human species, are the merest figments of his imagination. The historian Mosheim observes that "he ascribes to that Power, whom he extols as the fashioner and maker of the universe, few or none of the grander

attributes, such as infinity, immensity, ubiquity, omnipotence, omniscience; but supposes him to be confined within certain limits, and that the direction of human affairs is committed to a class of inferior spiritual agents, termed demons. This notion of ministering demons, and also those points of doctrine which relate to the origin and condition of the human soul, greatly disfigure the morality of Plato, since they manifestly tend to generate superstition, and to confirm men in the practice of worshipping a number of inferior divinities." His arguments in proof of the immortality of the soul are, likewise, equally fanciful and futile. Of these the following are examples: In nature, all things terminate in their contraries; the state of sleep terminates in that of waking, and the reverse; so life ends in death, and death in life. The soul is a simple, indivisible substance, and is therefore incapable of dissolution or corruption. The objects to which the soul naturally adheres are spiritual and incorruptible; therefore its own nature is so. All our knowledge is acquired by the remembrance of ideas had and entertained in a prior state: as the soul must have existed before this life, it is probable that it will continue to exist after it. Life being the conjunction of the soul with the body, death is nothing more than their separation. Whatever is the principle of motion must be incapable of destruction. Such is the substance of the arguments for the immortality of the soul, contained in the celebrated dialogue of the *Phædo*. Happy is it for us that our belief in this important doctrine rests upon firmer grounds than this species of weak and inconclusive reasoning. "And the *Republic of Plato*," says Dr. Adam Clarke, "of which it is fashionable to boast, is, when stripped of what it has borrowed from Moses, like the *Utopia* of Sir Thomas More, the aerial figment of a

philosophic mind, *en delire:* both systems are inapplicable and impracticable in the present state of man. To persons under the influence of various and discordant passions, strongly actuated by self-interest, they can never apply. They have no tendency to change the moral state of society from vice to virtue: a nation of *saints* might agree to regulate their lives and conduct by them; but where is such to be found? Though Plato has borrowed much from Moses, yet he has destroyed the effect of the whole, by not referring the precepts and maxims to God, by whom alone strength to fulfil them could be furnished."

In Plato, then, we find little more than the moon shining through a *less* clouded sky than Socrates, making no approach to Christ the Sun of Righteousness, whose system of instruction throughout is rational and consistent, and neither needs nor admits of emendation; who spoke of God, of creation, of the soul, and of immortality as man never spake.

The next great philosophic name we meet on the page of history is ARISTOTLE, a disciple of Plato, and the preceptor of Alexander the Great, born in the year 384 B. C. The principles of Aristotle, being in all cases remarkably obscure, have been matters of considerable dispute. It is certain, however, that in regard to the Supreme Being, he fell from the high and lofty teaching of his master, and taught the existence of Deity in a far lower and more unworthy sense. The learned Mosheim thus describes and characterizes his general system: "The Aristotelian doctrine gave to the Deity an influence not much beyond that of the moving principle in a piece of mechanism, considering him, indeed, to be of an highly refined and exalted nature, happy in the contemplation of himself, but entirely unconscious of what was passing

here below; confined from all eternity to the celestial world, and instigating the operations of nature rather from necessity than volition or choice. In a god of this description, there was surely nothing that could reasonably excite either love, respect, or fear." His system of morals, likewise, was far inferior to that of Plato, being based on mere *expediency* or *prudence*. The rule of moral conduct he found simply in the result of actions. We see hence that in all the teachings of this philosopher there is nothing that comes within the limits of comparison with those of the Great Teacher; we therefore dismiss them without further consideration.

The year 341 B. C. gave birth to another distinguished philosopher, EPICURUS, the founder of a celebrated school at Athens. This man taught that the universe consists of two parts—matter, and space, in which matter exists and moves; that matter is eternal, and originally existed in the form of minute particles or atoms; that the world, with all that it contains, was not made according to the design or by the power of any being, but arose out of a fortuitous concourse of these atoms; that the gods (whose existence, out of regard for the popular prejudice, he did not absolutely deny) were indifferent as to human affairs, or rather entirely unacquainted with them; that the souls of men are born and die; that all things depend on, and are determined by, accident; that in everything, pleasure or gratification, was to be sought after as the chief good, and pain, whether of mind or body, to be shunned as the chief evil. The disciples of such a teacher as this naturally studied to pass their lives in one continued round of sensual enjoyment; the only restraint they imposed upon themselves was to avoid such excesses as might result in pain, or generate diseases. To compare such a system to the teachings of Christ would be something more than absurd—it were profane.

The next and last system of Greek philosophy we are called to contemplate, in this review, is that of ZENO, a contemporary of Epicurus. The leading doctrines of Zeno were not original with him, but having attended the instructions of many eminent preceptors, and studied the opinions of the great teachers that went before him, he compiled out of their various tenets a heterogeneous system, on the credit of which he assumed to himself the title of a founder of a new sect, called Stoics, a name derived from *Stoa*, a porch, the place where he delivered his instructions. Zeno derived his code of morals mainly from the Cynics, and his theory of physics from the Platonic school. According to his ideas, matter existed in the condition of a dark and confused chaos from all eternity. God also existed from all eternity, an incorruptible, wise, and good Being, the efficient cause of all forms and motions. By the energy of this Deity the original chaos of matter became the world we see and inhabit. Matter is passive, and God is the animating principle or soul of the world. The agency of the Deity, however, both in creation and providence, is nothing more than the active motion of a celestial ether, or fire, possessed of intelligence, which at first gave form to the shapeless mass of gross matter, and being always essentially united to the visible world, by the same necessary agency preserves its order and harmony. Providence, in the Stoic creed, is only another name for absolute necessity, or fate, to which God, no less than matter, is immutably subject. Fate, it is declared, binds the gods as well as men; human and divine things alike are carried along in an irrevocable course. Human souls proceed from the divine nature, and at last return into the same. The highest virtue is to contemplate truth, and calmly submit in all circumstances to the fates. Virtue is to be

pursued for its own sake, and self-approbation is the chief reward. The sum of man's duty is to subdue his passions of joy and sorrow, hope and fear, and even pity. He who, in this respect, is perfect master of himself, is a good and happy man; and in proportion as an individual approaches this state of apathy, he advances towards perfection. A wise man may justly and reasonably withdraw from life whenever he finds it expedient to do so. "Since those things only are truly good which are becoming and virtuous, and virtue, which is seated in the mind, is alone sufficient for happiness, external things contribute nothing towards happiness, and, therefore, are not in themselves good. The wise man will only value riches, honor, beauty, and other external enjoyments as means and instruments of virtue; for, in every condition, he is happy in the possession of a mind accommodated to nature. Pain, which does not belong to the mind, is no evil. The wise man will be happy in the midst of torture. All external things are indifferent, since they cannot affect the happiness of man."

Such is Stoicism—the result of the combined efforts of many noble minds through a succession of ages. And it is a system, it must be confessed, that exhibits the fruit of much profound thought, and not a little sound reasoning, and embraces many elevated and even sublime sentiments. From certain points of view, it is a structure that externally presents a fair and imposing appearance; on closer examination, however, it will be found to contain numerous fundamental errors, and to be deficient in those elements which are necessary to give it effectual energy for moral good, or for religious excellence. It makes no essential distinction between God and matter. It makes his connection with matter the effect of necessity. It supposes his will to be subordinate to the immutable de-

crees of fate. Hence it is impossible to consider the God of the Stoic creed to be the author either of rewards to the virtuous, or of punishment to the wicked. It does not recognize, in any proper sense, the immortality of the soul, and thus deprives mankind of the strongest incitement to a wise and virtuous course of life. The piety which it teaches is little or nothing more than a callous submission to irresistible fate. The self-government which it enjoins is simply the extinguishing of the best affections of the heart. The indulgence or license it grants to mortified pride, disappointed ambition, or sullen discontent, namely, *suicide*, is not only inconsistent with its own principles of calm submission to fate, but is the highest crime against God, and against nature; yet it vindicates this dreadful deed, and in certain circumstances even commands it as a duty: Zeno himself terminated his existence with his own hands. The benevolence it prescribes, instead of being generous and sympathizing love, is devotion to an abstract idea, viz., that every individual is a portion of one great whole, from which it would be unnatural and impious to attempt a separation. The highest aim of the virtuous Stoic was to be proudly and coldly strong, to be superior to pain or pleasure, to offer help or relief without pity for the sufferer, or sympathy with the sorrowing. The obvious tendency of such a system was to create heartlessness, to nourish pride, and to make men artificial, hypocritical, and unnatural.

We have now contemplated the character and instructions of the most notable of the uninspired teachers and philosophers the world ever saw in the ages that preceded the advent of the Great Teacher, who came from above. We have reviewed the systems of Menu, Confucius, Zoroaster, Pythagoras, Socrates, Plato, Aristotle, Epicurus, Zeno and the whole school of Stoics—and what have we

found them? What do they amount to as compared with the teachings of Jesus of Nazareth? A few brief considerations will furnish us with a decisive answer to this question.

Since the systems of these philosophers were conceived and delivered to the world, mankind have made great advances in knowledge of every varied kind, in civilization and government, in the arts and sciences. And this increased light has shown clearly enough that those systems abound in errors—in false science, false morals, and false theology. But in the system of instruction delivered by Jesus Christ, all the light of modern times has not only failed to reveal a single error of this kind, but has served to prove his every utterance, to the minutest particular, to be in harmony with universal truth and in accord with all nature. Unlike those groping inquirers, he fell into none of the prevailing mistakes of his generation, committed himself to no philosophic theory of his day. He spake only what he knew to be fact, and testified only what he knew to be truth. Hence, as history, science and philosophy have increased and concentrated their light more and more upon the Gospel page, the more and more manifestly have its purity and perfection shined forth. Nothing brought to view by the progress of modern investigation and study; no fact noted by the explorer; no principle established by the moralist; no function revealed or explained by the physiologist; no discovery made by the microscope of the naturalist, or by the crucible of the chemist, or by the telescope of the astronomer—has created a demand for the change of a term, or the modification of a feature, in the doctrines taught by this Divine Teacher. It was verily the truth, and nothing but the truth, that flowed from his lips, on whatever subject he discoursed. How incomparably

superior, then, in this respect, does he appear to all that went before him.

Take now the philosophic systems which have passed before us, and sift out from them all that is erroneous and absolutely false—their untenable views of matter and the laws of matter; their unquestioned errors concerning the character and attributes of the one living and true God; their fabulous notions respecting the origin, transmigration and destiny of the human soul; their obvious mistakes in regard to the principles of moral duty, and the spirit of religious worship; their palpable errors in matters pertaining to geology, astronomy, meteorology and physiology—sift out all this, I say, and gather what remains of correct and valuable teaching in them all into one focus, and what is it compared to the wealth of unmingled truth and inestimable instruction embodied in the gospel of Jesus Christ?—what but the wan, pale light of the moon to the effulgence of the noontide Sun?

The teachings of our blessed Lord contain riches of wisdom and truth to be found nowhere else. Take, for examples, the following doctrines which involve the highest interests of every human being:—The character of God, his spirituality, unity, moral perfection, and paternal tenderness: The reconciliation of the alienated soul to God: Prayer and gracious answer to prayer: God in his holy mercy looking upon fallen, erring, perishing man: Man in penitence, faith, and filial obedience yielding himself up to God: The reign or dominion of the Holy Spirit over the understanding, affections and conscience of man: Human sin and Divine pardon: The worship of the Spirit God in spirit and in truth: Providence unremitting and universal: The divine virtues of humility, meekness, forgiveness and love: The heavenly charity that denies

self to benefit and to bless foes as well as friends: The final triumph of Divine grace over moral evil: The eternal and ever-brightening prospects of the righteous. Where, save in the gospel of our Lord Jesus Christ, can we find such profoundly interesting doctrines as these either propounded or conceived? Gracious truths! The enlightened and renewed soul, who alone can appreciate them, in pondering over their wondrous import, feels itself lifted into a holy region, where new expanses of light and glory in all directions break upon the sight, where unimagined wonders are revealed, and where an overpowering sense of divine grace swallows up every earthly interest! Turning from the glorious Gospel, where all this is found, to the dubious and meagre systems of heathen sages, how impoverished, how dark and cold do they all appear!

The teachings of Jesus Christ not only explain the facts and principles which perplex the reasoning mind, but go down and meet the irrepressible cravings of the human heart, and illumine the impenetrable cloud which has enveloped all our race. Man finds himself in a world of disorder and sin, suffering and death; feels within him longings and aspirations—longings and aspirations ever unsatisfied—after truth, happiness and peace; discovers himself endowed with faculties and affections that seem akin to heaven, yet sees himself excluded from heaven and inevitably descending to the tomb to return to dust again. And from the very depths of his soul he cries out, Who shall solve the problem of life? Who shall break these chains of darkness? Who shall deliver from this bondage of sin and this burden of guilt? Who shall dispel the terrors of the tomb and reveal what lies beyond? These are inquiries that sooner or later, in one form or another, arise in every reflecting mind, and

oppress it with a weight that words are vain to describe. But in Jesus Christ, and in him alone, we find full and clear answers to all these questions. The revelations he makes explain all, harmonize all. His wondrous cross exhibits at once the root and the remedy of all evil—*sin.* His own victory over death irradiates the grave with triumphant hopes. And the light which he brought from above brings life and immortality clearly to view.

Jesus of Nazareth stands alone as a Teacher of mankind, unapproached and unapproachable. The purity and perfection of his precepts, and the number, originality, harmony and grandeur of his revelations, separate him by an impassable distance from all that arose before his time, or that have appeared since. From his Divine Mind there shone forth a light which neither the priesthood of Egypt, nor the Shasters of India, nor the philosophers of Greece, nor the Senators of Rome ever kindled, and which no age before him or after him ever saw. Like the Sun in the heavens, he is without a compeer or a rival, incomparably above all.

## ANALOGY XIII.

*As the Sun's light is reflected from the ten thousand objects upon which it falls in so many systems of ether waves, which, though simultaneous in their outward flow, yet neither obliterate nor confuse one another—so the gracious light of the Sun of Righteousness, falling upon ten thousand hearts, is reflected in so many prayers, which, though simultaneous in their ascent, yet neither drown nor confound one another.*

### Phenomena.

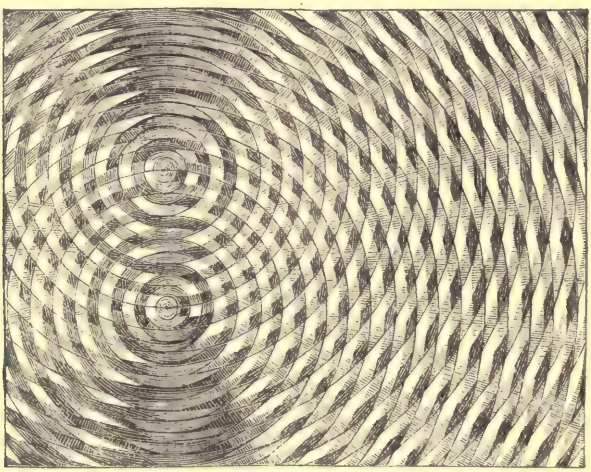
The medium through and by which light is propagated, and the pictures of surrounding objects are conveyed to the eye, has already been described at length, in Analogy

5, Part II., of this work, and to which the reader is now referred. In that chapter, we stated that the sense or impression of light is produced in the eye by vibrations in the all-pervading luminiferous ether, as the sense or impression of sound is produced in the ear by vibrations in the atmosphere. And both these processes, we there explained by reference to the waves observed on the surface of water; this is an excellent illustration, and we take it up again, as being the best we can employ for our present purpose.

If a pebble be dropped into the bosom of a still and smooth sheet of water, a circular depression is formed, at the point where it sank, which spreads wider and wider, with uniform velocity. In the meanwhile an elevation has been formed at the point where the pebble, in entering the water, had originally caused a depression; then as this sinks back to its original level it produces a wall-like circular elevation around it, which follows up the preceding circular depression with equal velocity. Whilst the water continues its up-and-down movement at the point struck, fresh wave-rings appear to proceed from this central point, which, owing to their constantly spreading more and more widely, give the illusory appearance of the fluid streaming out on all sides from the middle point.

Now, let us suppose that, instead of one pebble, two are dropped into the water at the same instant, but at a short distance one from the other. We shall have then two systems of circular waves moving and spreading out as before. As these two systems intersect each other, they divide the surface of the water into a regular network of small elevations and depressions, as represented in the annexed figure. Yet the one does not destroy or efface the other; at the points where two wave-crests

meet, the surface of the water, if the two waves are equal, rises to twice the height, and where two depressions meet, it sinks to double the depth. Thus each wave maintains and extends unbroken its circular and moving form, as if it had the entire surface to itself. And if, instead of two, we had three, or in fact, any number of pebbles dropped, the same result would be produced by each of them. In other words, it may be said that every wave system superimposes itself upon, or adds itself to, a surface already moved by waves, as it would do were it



INTERSECTION OF TWO WAVE SYSTEMS.

acting alone on that surface at rest. Every wave system forms itself unhindered by those already present, and spreads after it has crossed these, upon the still quiescent surface of the water as if it had suffered no interruption in its outward progress.

Once more: suppose that when we have flung a fistful of pebbles upon the water, each creating its little system of spreading waves, a succession of large billows or swells be produced by the wind or a passing steamboat, we shall see that even these do not destroy the little waves of the

pebbles, but take them on their backs, and having passed, leave them behind with their original forms and motions unaltered. Of all this we may witness a beautiful illustration when large drops of rain begin to fall upon the agitated surface of a lake or river.

Now, similar results, though invisible, are produced in the atmosphere by a blow on a drum or a bell, or by any number of such blows given in succession. These aerial vibrations, like the waves upon the water, do not destroy or extinguish one another. If a whole orchestra, composed of numerous and diverse instruments, play a piece of music together, each pipe and each string will create its own system of vibrations, which will pass outward through the atmosphere without disorder, each being endowed with an individuality as indestructible as if it alone had disturbed the quietude of the still air.

If now we advance to the far more attenuated and elastic medium of light, the ether, we shall find the same law still hold good. Here, as in the water and in the air, one system of vibrations, whether set in motion immediately by the Sun, or by reflection of the Sun's rays from some terrestrial object, does not interrupt or confuse another system. Each, though it may have crossed a hundred or a thousand others, maintains its existence and its identity unchanged, and bears on its bosom a correct and clear representation of the centre or object from which it has proceeded. These radiant vehicles of light are infallible in their progress and office; from ten thousand points, and in ten thousand directions, they unceasingly carry and imprint the messages of the world and of the universe. If we enter the garden, and bend over a bed of diverse flowers, we shall find that each green leaf and each variegated petal sends forth its little system of ethereal vibrations, announcing infallibly its par-

ticular form and color. If we stand confronted by a regiment of soldiers, the countenance of each individual, in like manner, sends forth its system of vibrations, and all meet in the eye, and imprint their pictures of those countenances on the retina within a circle that does not exceed in circumference that of a dime—not one is omitted; not one is blurred. If we look out on the broad landscape, each of its great features and countless objects does the same. And if we lift our eyes to the heavens on a clear night, vibratory waves still issue from those uncounted stars as their centres, and like the circles created by the drops of a shower on the surface of a lake, cross, coincide, oppose, and pass through each other without confusion or extinction. The waves of the zenith do not jostle out of existence those from the horizon, nor those from the horizon such as descend from the zenith, but each star, wherever situated, is clearly seen across all the entanglement of wave-motions produced by all other stars. The eye receives as perfect and distinct an impression of each, as if no other shone in the whole celestial concave.

What a marvel of creation, then, have we in this ethereal element—its illimitable extent, its inconceivable tenuity, its undecaying elasticity, its countless and instantaneous vibrations—without which the earth, and the stars, and even the Sun itself would have been wrapped in eternal darkness! And what an organ have we in the eye, with its congeries of related parts, to adapt it to receive and interpret these ether vibrations without effort or delay, and thus derive from it a thousand advantages and pleasures every hour! And to what shall we ascribe all this? To chance? To the blind and senseless *evolution* of the materialist? Sooner let us say that the pictures of Raphael have been produced

by the dashing of the waves; or that the unerring chronometer, which guides the mariner over the trackless main, has resulted from the fortuitous dancing of a cloud of dust. Nay, O Lord God,

> "These are thy glorious works, Parent of good,
> Almighty! Thine this universal frame,
> Thus wondrous fair: Thyself how wondrous then!
> Unspeakable, who sitt'st above these heavens
> To us invisible, or dimly seen
> In these thy lowest works; yet these declare
> Thy goodness beyond thought and power divine."

## Teachings.

Now, as the Sun's light, in the manner just described, is reflected from the ten thousand objects upon which it falls in so many systems of ether waves, which, though simultaneous in their outward flow, yet neither obliterate nor confuse one another, *so the gracious light of the Sun of Righteousness, falling upon ten thousand hearts, is reflected in so many aspirations or prayers, which, though simultaneous in their ascent, yet neither drown nor confound one another.* Accordingly it is written, "Look unto him, and be ye saved, all the ends of the earth: he is able to do exceeding abundantly above all that we ask or think, according to the power that worketh in us."

The luminiferous ether, as stated in preceding pages, occupies all space; the whole material creation is afloat in it, and permeated by it. It penetrates all bodies, even the hardest and most compact. It surrounds the very atoms of all solids and liquids. Its presence is excluded from no place, from no substance. It is all-pervading. Man finds himself surrounded and embraced by it wherever he goes. Let him climb to the summit of a mountain, or go far hence upon the sea, and its presence is attested by every object that he beholds. Let him walk forth into the gloom of the darkest night, or descend

into the depths of the profoundest cavern, and but light a candle or touch a match, and in a moment it manifests itself even here in the rays it spreads all around. And herein we have an impressive type, a sensible help to a conception, of the omnipresence of the Divine Being. God is a spirit, and in a similar way, but infinitely higher sense, fills immensity, occupies all space; is absent from no region, excluded from no locality, no substance. And he is not part here and part there, nor a whole anywhere, but is the same God, complete in all his perfections, in all places—all eye, all ear, all intellect, at every point of space, occupied or not occupied by created things. The material universe, in all its parts, and with all its living occupants, to use the words of the immortal Newton, is afloat within "his boundless uniform sensorium." Hence it is impossible that he should not see and hear and know all things, in every place and at every moment of time, seeing he is in living contact, not only with all matter, but with all the springs of mental activities. How explicitly and how sublimely is all this set forth in the inspired Word: "O Lord, thou hast searched me, and known me. Thou knowest my downsitting and mine uprising; thou understandest my thought afar off. Thou compassest my path and my lying down, and art acquainted with all my ways. For there is not a word in my tongue, but, lo, O Lord, thou knowest it altogether. Thou hast beset me behind and before, and laid thine hand upon me. Such knowledge is too wonderful for me; it is high, I cannot attain unto it. Whither shall I go from thy Spirit? or whither shall I flee from thy presence? If I ascend up into heaven, thou art there: if I make my bed in hell, behold, thou art there. If I take the wings of the morning, and dwell in the uttermost parts of the sea, even there shall thy hand lead me, and thy right

hand shall hold me. If I say, Surely the darkness shall cover me; even the night shall be light about me. Yea, the darkness hideth not from thee; but the night shineth as the day: the darkness and the light are both alike to thee." Psalm cxxxix. 1–12.

And now, how stands all this in relation to our devotions—our confessions, supplications and thanksgivings? If the atmosphere is such an element that we cannot speak, or whisper, or even breathe, but it is moved thereby into quivering vibrations; and if the ether is such a medium that we cannot strike a spark or the minutest scintillation, but it feels it, and is quickened by it into instantaneous and outflying waves: infinitely more sensitive is the living omnipresent Spirit of God to every spark of devotion, every sigh of prayer, every emotion of penitence, that springs up in the hearts of his earthly children. Yea, we breathe not a petition, we shed not a tear, we feel not a pang, but it vibrates through the bosom of our Father in heaven, and awakens there its response of sympathy and mercy. "Like as a father pitieth his children, so the Lord pitieth them that fear him."

Nor does the simultaneous offering of prayer by a thousand other suppliants in anywise hinder the success of our own. We have seen that the numberless systems of light-waves which perpetually flow outward from all the visible objects around us do not in any manner or degree interfere one with another. The same holds true in regard to the myriad aspirations that ascend from the earth towards the throne of grace. As the vibrations sent forth from the bosoms of all the gorgeous flowers in the garden do not extinguish nor enfeeble those that proceed from the lone violet under yonder bush; so the solemn Litany and the loud *Te Deum* of the assembled

multitude before the altar do not drown the "God be merciful to me a sinner" of the publican that stands afar off. And as the wave systems of light that come down from all the stars of heaven do not quench that set in motion by the glow-worm; so neither do all the anthems and "choral symphonies" of the angels around the throne silence or hinder the supplication of the humblest petitioner upon his footstool earth. The prayer of faith, like the radiant waves of light, though proceeding at one and the same instant from a million hearts, infallibly and without delay reaches the ear of the Father of Mercies.

Nor, once more, does the social or earthly condition of the suppliant affect the success of his prayer. Light waves from whatever centre they proceed, and of whatever color they may be—red, blue, yellow or indigo—travel through space with exactly the same velocity. So also is it with the vibrations of prayer. The devotional offerings of believing souls, whatever their lot or condition may be—rich or poor, learned or ignorant, dwellers of Greenland or Ethiops of Africa—ascend with equal speed to the common and loving Father of all, and find with him an equal audience. The prayer of the monarch does not outstrip the suit of his subject, nor the petition of the priest gain precedence of the sighing of the prisoner. "For there is no difference between the Jew and the Greek, for the same Lord over all is rich unto all that call upon him."

## ANALOGY XIV.

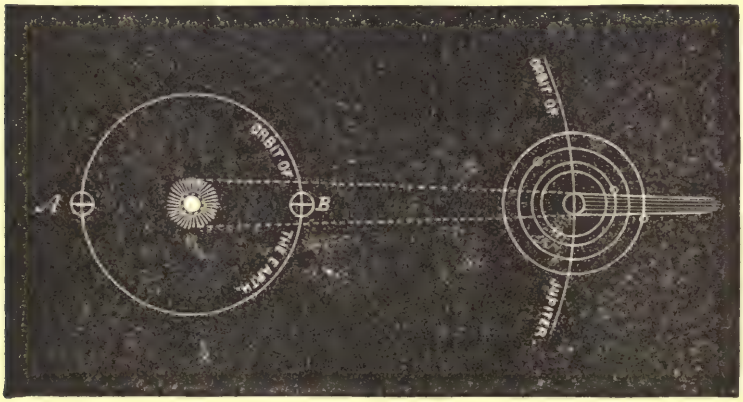
*As the Sun of nature darts down his beams, messengers of light, with amazing speed, to illumine and cherish the living tenants of the earth—so the Sun of Righteousness sends forth his angels with like speed, to minister to them who shall be heirs of salvation.*

### PHENOMENA.

THAT *sound* occupies time in travelling through the air is a fact that has long, if not always, been known. Various familiar incidents would serve to reveal this to the most rude and unreflecting. The shepherd, seeing the woodman's axe, on the opposite hill, strike the tree, would observe, that ere he heard the sound of the stroke, that axe was lifted high again for another blow. As the sportsman fired his gun, a mile off, the passing traveller would perceive the flash, but would mark that the pulse in his wrist beat not less than four or five times before the report saluted his ear, this length of time having been occupied by the sound in reaching him. But of the motion of *light* the world remained in total ignorance through the long ages of its history. Until comparatively a recent date, light was supposed to pass instantaneously from point to point, however remote. To detect the motion and measure the speed of this sublime and refined element was a matter of far greater difficulty, and remained hidden to constitute one of the triumphs of modern science.

The earth, as all know, revolves around the Sun at the distance of some 92,000,000 of miles, accompanied by a single moon; and the planet Jupiter revolves in like manner far outside, at the distance of 475,000,000 of miles from the Sun, attended by four moons, which encircle it at different distances and in different periods of

time. This planet and its four satellites constitute a distinct and beautiful system of worlds, which, from the time of its discovery by Galileo, has presented to astronomers a most interesting subject of study, and from which have been reaped fruits of the greatest importance. The observed movements of this miniature system furnished a final demonstration of the Copernican theory of astronomy, and also a satisfactory confirmation of the laws of Kepler respecting the periods and distances of the planets. From this system likewise has been deduced an infallible method of determining *longitude*, at sea or on




JUPITER AND ITS SATELLITES.

land; a result of the greatest practical interest to mankind. But the grandest discovery of all made by means of this planet system was *the velocity of light;* and the way in which this was accomplished we now proceed to explain.

The satellites of Jupiter, like our own moon, suffer frequent eclipses, by falling into and passing through the shadow of the planet on the side opposite to the Sun, as represented in the annexed Figure. The three interior of them are so near the planet and move so nearly in the same plane, that they pass through its shadow and

undergo an eclipse at every revolution. These eclipses have been carefully observed, and the time of their occurrence registered, ever since the discovery of the satellites. In short, their dimensions, distances, forms, and situations with respect to the planet, are now perfectly well known.

The earth's orbit being within that of Jupiter, and the two planets travelling at different velocities, it is obvious that their mutual distance must continually vary, the variation extending from the *sum* to the *difference* of their radii; and the difference of the greatest and least distances being equal to the diameter of the earth's orbit. All this will be apparent by a glance at the preceding diagram. Now it was observed as early as 1675, by Roemer, a Danish astronomer, on comparing together observations of eclipses of the satellites of Jupiter during many successive years, that the eclipses at and about the opposition of this planet, or its nearest point to the earth, as at B, took place *too soon*—sooner, that is, than, by calculation from an average, he expected them; whereas, those which happened when the earth was in the part of its orbit most remote from Jupiter, as at A, were always *too late*. In fact, there was a difference of sixteen minutes and twenty-six and three-fifths seconds between the time at which the eclipses actually appeared to occur, from A, and the time when they appeared to occur, from B. Studying and inquiring into the cause of this perplexing discrepancy, step by step he was led to the conclusion that the light of the satellites, as they emerged from the planet's shadow, must occupy that length of time in crossing the earth's orbit from B to A, a distance of 184,000,000 of miles. Grand conception! It explained every particular of the phenomenon, and satisfactorily did away with all the difficulties it presented. The problem was solved.

But this conclusion seemed to give Light a velocity that transcended, not only all that had been discovered among the heavenly bodies, but even all reasonable belief. Its announcement, like a thunderclap, startled the most vigorous and profound intellects of the day; and however conclusive the evidence in proof appeared to be, many hesitated to give to it their full assent, anxiously looking for corroboration from some other quarters. That corroboration has since been afforded in several ways. Roemer's conclusion has received the most satisfactory confirmation from calculations based on Bradley's discovery of the *Aberration of Light*, a process which we cannot stop here to detail. It was afterwards proved by M. Fizeau, by direct experiments with reflecting mirrors; and, lastly, by M. Léon Faucault in still another way. So that it is now an established fact, that light descends from the Sun to the earth in eight minutes and sixteen and one-third seconds, thus travelling at the rate of 185,000 miles per second!

Here, truly, we have one of the greatest marvels of the material universe. Who can appreciate it? Who can form an adequate conception of it? All our ideas of magnitude and motion are relative, and derived from comparison. Let us resort to comparison to assist us here. Time was when "the speed of the horse," "the flight of a bird," "the wings of the wind," were superlative expressions for swiftness of motion; but what are these compared to the motions brought to light by the science of the present day? The globe upon which we dwell has been discovered to revolve on its axis with a speed that carries round all that dwell near its equator at the rate of 1,000 miles per hour—a speed ten times that of the sweeping hurricane. In its forward motion along its orbit, the earth travels at a rate not less than 65,000

miles an hour; a velocity that is overwhelming to contemplate. But even this makes no approach to the swiftness of light—the light waves, in their descent from the Sun, move at a rate not less than 10,000 times faster than the earth in its annual career through the heavens. Or, if it would help our conception better, we may add that, the swiftness of light is such as would carry it round the earth more than seven times in a single second of time!

In this manner and by these means the Sun holds speedy and unceasing communication with all the planetary globes that compose the magnificent system of worlds of which he is the head and ruler. On the swift wings of the ether vibrations he daily sends his beneficent and welcome messengers, light and heat, to all his dependent planets; and from each of these again, by reflection, they fly to all the rest, announcing not only its continued existence, but its every change of position or brightness. In this way these solar messengers come and go between all the numerous members of the system, travelling without fail and without weariness the voids of space in all conceivable and in all possible directions. And thus the great Orb of Day is in perpetual and infallible communication with every province of his vast empire.

### Teachings.

In what has now been stated respecting the Sun of nature, we may discover *an adumbration or type of the higher and living system of communication established and maintained between the Sun of Righteousness and every portion of his spiritual kingdom, every office-bearer and every member of his true church.* All that we know of this is purely a matter of revelation; and in his holy Word he informs us that his ministers and messengers are "the

angels," "legions of angels," even "an innumerable company of angels;" and that these, at his bidding, descend with the swiftness of light to the earth, and walk to and fro therein, "ministering to them who shall be heirs of salvation." On the authority of these Scripture statements the great epic poet of England has said, that

> "Millions of spiritual creatures walk the earth
> Unseen, both when we wake, and when we sleep."

Of the visitations and ministry of angels we have related to us numerous instances both under the Jewish and the Christian dispensations. Angels watched over Abraham his chosen, rescued Lot from Sodom, comforted Jacob in his lone wanderings, encamped around David in his distress, saved Daniel in the lions' den, and wrought many other deliverances for Israel his people. And when we come down to the New Testament history, the benevolent visits of angels multiply upon us, and we find their presence and their aid spoken of familiarly, and almost as things of course. Angels announced the Saviour's birth to the shepherds at Bethlehem, ministered to him at the close of his protracted fasting and temptation, strengthened him in his agony in the garden, watched at the sepulchre in which he was laid, and accompanied him in his ascension and return into heaven. An angel liberated the apostles when incarcerated for declaring the resurrection of Christ, appeared to Philip and to Cornelius, delivered Peter from Herod's prison and from the expectation of the Jews, and stood by Paul in the hour of impending shipwreck. And of these angelic messengers, it is declared *in general*, and *for all time*, that they are present in the assemblies of Christians, that they rejoice over sinners that repent, that they watch over Christ's little ones, that they minister to them through life, and

at death bear their ransomed spirits in triumph home to glory.

In this system of angelic ministry employed by Him who is Lord of all, we have not only what may be regarded as a parallel to what we have seen carried on so marvellously by the Sun of nature, but what is in beautiful harmony with a general principle of the Divine administration. In the kingdom of grace it is ordained that one class or grade of his creatures shall aid and serve another less able than themselves. Parents are appointed and enjoined to assist and guide their children, the rich to pity and relieve the poor, the enlightened to instruct the ignorant, and the strong to help and shield the weak. So, likewise, the wise and powerful and holy angels are appointed to succor, protect, and guide the frail and imperiled disciples of Jesus. Accordingly, entering with their whole heart, as they ever do, into the purpose of their Divine Lord, and delighting to do his will, we find that on whatever occasion they are sent forth, they are exhibited as taking an intense interest in the scheme of human salvation, as being keenly alive to whatever affects his church, and as sympathizing most tenderly with his people in all their trials and perils. In short, the statements of the Bible are such as compel us to believe, that the redeemed sinners of earth engage the watchful inspection and unceasing care of myriads of the heavenly hosts—that these illustrious creatures who have never swerved from their loyalty and love, gather around those who come out of the mass of unrighteousness, to sustain, protect, and guide them through the perils of this wilderness, until they enter and are safely lodged within the heavenly fold.

To indicate their activity and swiftness in executing the Divine commands, the angels are represented as hav-

ing "wings"—wings being the symbol of rapid flight. Thus Isaiah: "I saw the Lord sitting upon a throne, high and lifted up, and his train filled the temple. Above it stood the seraphim: each one had six wings; with twain he covered his face, and with twain he covered his feet, and with twain he did fly." So in the Book of Revelation: "And I beheld, and heard an angel flying through the midst of heaven," etc.; and again: "And I saw another angel fly in the midst of heaven, having the everlasting gospel," etc. For both proof and illustration of the swiftness with which angels fly on their missions, we need but refer to one or two of the instances on record in the sacred volume. And we mention first that related in connection with Daniel (ix. 20, 23), and which, for the reader's convenience, we quote:—"And while I was speaking, and praying, and confessing my sin, and the sin of my people Israel, and presenting my supplication before the Lord my God for the holy mountain of my God; yea, while I was speaking in prayer, even the man Gabriel, being caused to fly swiftly, touched me about the time of the evening oblation. And he informed me, and talked with me, and said, O Daniel, I am now come forth to give thee skill and understanding. At the beginning of thy supplications the commandment came forth, and I am come to show thee; for thou art greatly beloved: therefore understand the matter and consider the vision." Now let us mark the bearing of the facts embraced in this remarkable narrative on the point before us, namely, the swiftness of angels' flight.

When Daniel entered upon his devotions, Gabriel was in Heaven, that holy and supreme world, the dwelling place of angels and of the spirits of all the just made perfect, in which the omnipresent Deity affords a nearer and more immediate view of his perfections, and a more

sensible manifestation of his glory than in any other part or province of his boundless dominions. As to where heaven is, we have no express information; but we have many and good reasons for believing that it is far beyond the uttermost verge of the system of worlds to which our globe belongs, and constitutes the centre and metropolis of the universe. There it was that Gabriel received the command to go forth immediately and visit Daniel, who was now humbling himself and offering his supplications in this nether world, and convey to him the important message related in the latter part of this chapter. Now, Daniel *had begun* his prayer when the command was issued. The prayer is here recorded, and the deliberate and solemn utterance of the whole of it could not have occupied more than five or six minutes; yet before he had finished it, "yea, while he was yet speaking in prayer," Gabriel being caused to fly swiftly, reached the spot where he was bowing before the Lord, and touched him, and said to him, "O Daniel, I am now come forth to give thee skill and understanding. At the beginning of thy supplications the commandment came forth, and I am come to show thee; for thou art greatly beloved." In so short a time did he traverse the mighty space which separates Highest Heaven from earth. Here, then, was speed that as far outstripped the speed of light, incomprehensible as that is, as the speed of light outstrips that of sound. It occupies light to reach the earth from the outermost planet of our system, full four hours; but Gabriel, on this errand of grace, came from the Heaven of heavens in as many minutes—came with the rapidity of thought! Well and truly hath the poet said,

"The speed of Angels time counts not."

A similar visitation of an angel we find in the history

of St. Paul, which, though not so specifically detailed, yet must involve substantially the same facts. It occurred during that memorable voyage from Cæsarea to Rome, when, through the protracted violence of the storm, all hope of being saved was taken away. But this devoted disciple of Jesus was not left without hope; an angel was sent down to reassure and comfort him. And when all others had yielded to despair, he exhorted and said to his fellow-voyagers, "Be of good cheer, for there shall be no loss of any man's life among you, but of the ship. For there stood by me this night the angel of God, whose I am, and whom I serve." This angel, without doubt, as in the case of Daniel, was specially commanded and sent forth by God, to minister to his faithful servant in this hour of great peril. The Divine behest announced, "I delight to do thy will, O my God," was the devout response; and casting his eye over the wilderness of suns and systems which lay before him, with a glance he discerned among them the diminutive and distant globe for which he was commissioned; and though that globe was rushing through space at the rate of 65,000 miles per hour, and at the same time rotating swiftly upon its axis, yet nor distance nor speed presented any difficulty to him. Quickly he overtakes the flying planet, marks its revolving meridians, and, unhindered by tempest or darkness, at once alights by the side of that weary and exhausted heir of salvation, to minister the needed cheer and assurance—"Fear not, Paul; thou must be brought before Cæsar, and God hath given thee all them that sail with thee." Such is the speed of angels.

The earth being but one of the inferior dependencies of the Great King, we may reasonably suppose that these angelic beings may visit the other and greater worlds

which compose the system of creation to which our globe belongs—that they wing their flight from planet to planet on similar errands, to minister in a thousand ways to their innumerable and diversified populations. We read of "angels in the heavenly world," of "angels standing on the four corners of the earth," of "the angel of the bottomless pit," and of "an angel standing in the sun;" why, then, should it be incredible that they may be often commissioned to visit the magnificent worlds of Jupiter, Saturn, Uranus and Neptune? Nay, there is nothing to forbid the supposition that, they may pass from system to system to execute the decrees and to further the plans of the Most High. Certain it is that the names given to them in the scriptures—Thrones, Dominions, Principalities and Powers—imply the exercise of such offices. And if this be so, in the course of the countless ages of the past, who can conceive what numerous and mighty journeys they have accomplished, what displays of creative wisdom and power they have witnessed, or what natural and moral wonders they have surveyed! When the Sun was kindled in the heavens, and the globe upon which we dwell was called into being, transported with the display of omnific power and infinite wisdom, we read that these "morning stars sang together, and all these sons of God shouted for joy." And it may have been their privilege, many times since, to witness a repetition of the stupendous scene in different regions of infinite space.

What a fruitful field for contemplation does the ministry of angels open up to us! What new and surprising ideas of spiritual existences does it suggest! What sublime prospects does it reveal! From facts such as have now been related, it appears that the general laws and great forces of the material universe have no power over

angelic or spiritual beings. Gravitation neither weighs them down, nor impedes them in their progress. Heat and cold do not affect them. The blaze of Suns does not dazzle them, nor the darkness of the deep obscure their vision. What marvels of existences! But what invests this aspect of the nature and offices of angels with special interest to us is the hope given us of attaining to similar powers and privileges, when we shall leave the present and enter upon our future state of being. "They who shall be counted worthy to obtain that world," saith the Saviour, "can die no more, for *they are equal with the angels*, and are the children of God." That is, they shall be elevated above the conditions of mortality, and be endowed with the powers and privileges of angels. Or, as Matthew Henry interprets the words, "They shall be angels' peers, and shall see the same sight, be employed in the same work, and share in the same joys with angels." Accordingly, in another scripture, the angels are said to be *fellow-servants* with the saints. We are warranted hence to infer that, redeemed souls have set before them the inspiring hope of being endowed with the power and energy of angels, and of being, like them, able to fly from world to world with the speed of light. Moses and Elias, after long centuries of absence from the earth, came thus from glory to converse with Jesus on the Mount of Transfiguration; and we shall be like unto them. Yea, more is said: when the Lord shall appear in his glory, with his holy angels, we shall be *like Him*, for we shall see Him as he is."

What a prospect, then, is that set before the humble followers of Jesus! Once emancipated from the flesh, they ascend unto "the city of the living God, the heavenly Jerusalem, to join the innumerable company of angels, and the general assembly of the just made perfect." From

thence it may be theirs to go forth, as on the wings of light, to survey the unnumbered wonders of other worlds, the habitations of different grades of intellectual and moral beings, to witness their social order, and to join with them in their worship of the Lord God omnipotent. It may be theirs to roam over the broad belts of Jupiter, and to survey the overaching rings of Saturn. Yea, they may spend the unending ages of futurity in passing from globe to globe, and from system to system, contemplating the endlessly varied displays of divine wisdom and power and goodness which the illimitable universe everywhere presents. Oh, what sublime prospects, what ravishing discoveries, what divine entertainments await the spirits of the just made perfect, made like and equal to the angels! "Eye hath not seen, ear hath not heard, neither have entered into the heart of man the things that God hath prepared for them that love him."

## ANALOGY XV.

*As the light of the Sun, while it reveals all else, remains itself invisible—so the Holy Spirit of the Sun of Righteousness, while "he reveals all things pertaining to life and godliness," himself cannot be seen or apprehended by any of our senses.*

### Phenomena.

It is the impression of men in general that they can see light, and any statement to the contrary seems to them incredible; and if they are told that light is invisible, they are at once disposed to reply that, if they know anything, they know that they see the light of the Sun. This, however, is not the fact; light cannot be seen. This we now proceed to prove and illustrate.

Light, though the cause of vision, is itself invisible. A sunbeam, indeed, is said to be seen when it enters through a hole in a shutter, and shoots across a dark room; or when luminous bands or rays are observed to dart from the Sun through openings in the clouds, spreading like a fan towards the horizon. But the thing seen in such cases is not the light, but the floating dust in the room, or the innumerable particles of vapor or smoke afloat in the air, which catch and reflect a small portion of the light. The same thing may be observed in a foggy night, when the light from the lamp of a locomotive seems to throw out a broad diverging luminous cone; this cone, as before, is formed by the reflection of the minute particles composing the vapor; it consists simply of the illuminated portion of the fog. If the air was perfectly dry and clear (which, as a fact, it never is), no such cone could be seen, though the lamp continued brilliant as ever. We become sensible of the existence of light only through the presence of some material object or substance upon which it falls, and from which it is reflected.

The light or ether waves flow outward from the Sun in all directions and without intermission, filling an immeasurable sphere of space around him; but these waves are invisible, and their existence is made known only at such points of space as are occupied by some material body or globe, such as the moon, from which they are reflected. This may be illustrated in some degree by the motion of the atmosphere. A man looking out of his window, over a broad and naked plain, sees at a distance a windmill turning rapidly; from this he knows that the air must move over that spot with great speed; but half a mile to the right, or half a mile to the left, he can discern no evidence of any current or motion in the air;

nevertheless, the wind blows just as strongly at these points as at that occupied by the revolving wheel, and if this could be instantly removed to either of these spots, it would prove this to be the fact by its equally rapid revolution. The wind sweeps equally over the whole plain, but manifests itself only where it strikes the wheel. Something similar to this is the case with the outward flow of light-waves from the Sun. These are in rapid and perpetual motion everywhere, but their existence is revealed only where they fall upon some body of matter, such as the moon or the planets, from which they are reflected to the eye and become known; but all around those globes, like the wind around the windmill, they pass on unimpeded and invisible.

To prove this, let the reader go out on a dark night, and let him fix firmly a telescope, or any simple tube, pointing directly to the moon. Looking through it, he sees her a bright circle in the firmament; but this globe is a mass of dead, dull matter, and has no light in itself; it becomes luminous by reflecting the light-waves that fall upon it from the Sun. Now, let him wait an hour, while the moon is advancing in her nightly round, and then look through his telescope still fixed in the same direction, and lo, all is dark, though we are sure the light-waves sweep over the spot just as they did when the moon was there; but he sees them not; in themselves they are invisible. Let him now shift the direction of his telescope, and fix it so as to point to a spot some ten or fifteen degrees in advance of that occupied by her at present, and look through, and all is dark; but let him wait again till the moon shall arrive at that point, and then look up; behold, there again she presents a disc bright as ever. The light-waves were there before her arrival, and she becomes visible only by entering and reflecting them, for she has no light of her own.

What is thus true of the moon is equally true of the planets and all their satellites. These, likewise, have no light in themselves, but become visible only by reflecting the light of ether waves; and as they continue visible at every moment throughout their vast circuits, it is manifest that they are every moment floating in the ocean of light-waves proceeding from the Sun. Light, then, there *is* at all times, through all the space occupied by the planetary system, but not visible as a thing. It exists as an agency, and is, at every point, in ceaseless activity. All the dark void around our globe (outside of its shadow) is, so to speak, flooded with the Sun's light, yet we see it not, and perceive only darkness.

The common idea, and the expressions in common use, therefore, are, strictly speaking, erroneous. We cannot see light. "In interstellar space," says Tyndall, "we should be plunged in darkness, though the waves from all suns and all stars might be speeding through it. We should see the suns and we should see the stars themselves, but the moment we ceased to face a star, the moment we turned our backs upon it, its light would become darkness, though the ether all around us might be agitated by its waves. We cannot see the ether or its motions, and hence, strictly speaking, it is a misuse of language to speak of its waves or rays being visible."

But light, while thus itself invisible, reveals all created objects, great or small, near or afar off. Nothing upon which its beams fall can remain hidden. Let the eclipsed satellite, however small, but peep from behind its parent orb, and instantly light reveals its face. Let the distant Neptune roll on in its lonely path to the remotest part of its orbit, and light will detect and expose it even there. Let the comet return from its wanderings for thousands of years through the depths of infinite

space, and light will at once announce its approach. Let the filmy cloud float through the highest region of the atmosphere, and light in a moment acquaints us with its presence and its direction. Or, let a ship arrive and rest on the verge of the horizon, or a flag wave on the distant mountain top, or a beast flit across the vanishing plain, and light, without delay, proclaims its form and color and motion. Nothing is too remote, or too little, for the refinement of its detective and revealing powers. It illumines and shows to us the very minutiæ of nature, animate and inanimate. It exhibits the movements and members and functions even of the animalcules, whose diminutiveness is so extreme that a million of them find an ample world within the circumference of a single drop of water. But while it thus reveals all else, *itself* remains invisible, inaudible and intangible, a hidden mystery, inapprehensible to all mortal sense.

## Teachings.

In this invisible nature and activity of light, we have a beautiful analogy to, and illustration of the operations of the Holy Spirit on the minds of men, who, *while he reveals to them "all things pertaining to life and godliness," yet himself remains unseen and undiscerned.*

A spirit, even the spirit of a man or of an angel, from its very nature, is not to be perceived by any of our corporeal senses. Being an immaterial substance, it cannot be discerned by organs that are material. These are altogether destitute of the requisite perceptivity to receive impressions from a spiritual existence. As the perception of colors is beyond the powers of the ear; or, as the distinction of sounds is beyond the powers of the eye, so the discerning of a spirit is beyond the powers of all our senses. And if this be the case in regard to a created

spirit, much more with respect to the Uncreated and Eternal. The Divine Holy Spirit is infinitely above and beyond the cognizance of all human powers. He is an omnipresent Mind, an immense Intelligence, "dwelling in light which no man can approach unto; whom no man hath seen nor can see."

Though the Holy Spirit, like light, be thus invisible to mortal eyes, yet, like the light also, he reveals to them all truth and knowledge necessary to spiritual and eternal life. Early he revealed to men the plan of human redemption. At sundry times and in divers manners, we are told, holy men of old, prophets and apostles, spake of this "as they were moved by the Holy Ghost." "The Spirit of Christ which was in them," saith Peter, "testified beforehand of the sufferings of Christ and the glory that should follow." And Paul, the chosen agent to make known the way of salvation to the Gentiles, says, "By revelation he made known unto me the mystery, which in other ages was not made known unto the sons of men, as it is now revealed unto the holy apostles and prophets by the Spirit." Again, "Eye hath not seen, ear hath not heard, neither have entered into the heart of man, the things which God hath prepared for them that love him; but God hath revealed them unto us by his Spirit." Thus all holy scripture was given by the Inspiration of the Divine Spirit; yet those who received these his communications "neither heard his voice nor saw his shape, at any time."

The revelations of the Spirit, it is our happiness to be assured, ceased not with the prophets and apostles; they are still continued to the children of men. But the revelations he now makes are not new truths, but *new and correct views* of truths already given. "The natural man receiveth not the things of God; for they are foolishness

unto him; neither can he know them, because they are spiritually discerned." Hence the necessity that the eyes of his understanding be enlightened by the Spirit. Accordingly, the apostle addressing those who had become Christians, saith to them: "Ye are a peculiar people, and should show forth the praises of him who hath called you out of darkness into his marvellous light."

The Holy Spirit reveals to man *the true meaning and spirit of the law of God.* With the letter of this law he may be acquainted, may be so familiar as to be able to repeat it like his alphabet; but in his natural state, he has no proper apprehension of the exceeding length and breadth, depth and height of its requirements; he sees not its extent and purity and holiness and justice; realizes not that it reaches to the very thoughts, intents and emotions of the soul—that it prohibits the covetous desire as well as the dishonest act, and condemns the lustful glance no less than the unclean deed—in short, that nothing less than supreme love to God in all his conduct will meet its demands. Such an apprehension of the Divine Law is nothing less than a revelation.

The Holy Spirit also reveals to man *his own true character.* The view he has of himself by the light of nature and that he acquires by the light of the Spirit are widely different. In his native state he is disposed to think well of himself, and to palliate his errors and failings by many excuses. But when the Spirit holds up the Law in its purity and spirituality, as a clear mirror, before his face, he discovers his real character and condition, his sinfulness and his guilt and his peril. With eyes enlightened and conscience quickened, a thousand things in his heart and life, which he had been wont to esteem as harmless, now appear to be positive sins; and what he once regarded as slight or venial deviations are now seen

to be aggravated offences against God. Sins past, sins forgotten, sins of which he had ceased to be conscious, now revive and arise as living swarms before his view, look to whatever portion of his history he may. He finds and feels that the Law condemns him at every point and through every period of his life. While "without the law," that is, without a right understanding of the law, "he was alive;" but now that the commandment has come, illuminated by the Holy Spirit, "sin revives, and he dies."

Again, the Spirit reveals to man Jesus Christ as *the only Saviour from guilt and condemnation.* Of this Redeemer, and of his gracious mission into the world, he had heard from his earliest childhood, but felt no personal interest in him, no personal need of him. But now that he has discovered his sinfulness, his condemned and perishing condition, he realizes his need of a Saviour; and the Holy Spirit opens his eyes to see in Christ just such a Saviour as his case requires—to see in his death a full atonement for his sins—to see in his righteousness a full satisfaction to the demands of the Law against him —to see in him an all-availing Intercessor with God in his behalf—to see in him an Almighty Friend, able and willing to conduct him safely through all the perils of life, and at last to bring him home to everlasting rest and glory. And beholding him in this attractive light, he flees to him for life, and commits himself soul and body into his hands, as unto a faithful Creator.

The Holy Spirit, in short, reveals to the believing soul *all things in a new light,* so that he can say, "Old things are passed away; behold, all things are become new." "He has new views of God, and of Jesus Christ; new views of this world and of the world to come; new views of truth and duty; and everything is seen in a new aspect

and with new feelings. The Bible seems to be a new book, and though he may have often read it before, yet there is a beauty about it which he never saw before, and which he wonders he has not perceived. The whole face of nature seems to him to be changed, and he seems to be in a new world. The hills and vales and streams, the Sun, the stars, the groves, the forests, seem to be new. A new beauty is spread over them all, and he now sees them to be the work of God, and his glory is spread over them all; and he can now say, 'My Father made them all.' The heavens and the earth are filled with new wonders, and all things seem now to speak forth the praise of God. Even the very countenances of friends seem to be new; and there are new feelings towards all men; a new kind of love to kindred and friends; a love before unfelt for enemies; and a new love for all mankind."*

Such are the gracious revelations which the Divine Spirit makes to the children of men. But in all these disclosures, the happy subject of them neither sees the form nor hears the voice of the Spirit that makes them. As with the ether waves, so with this Divine and Holy Agent, in all his communications, there is nothing visible, nothing audible, nothing palpable, nothing ascertainable by any of the senses. He knows their truth and reality only by their effects, as he knows the reality of the light-waves by their illumination of the moon's disc. The influences of the Holy Spirit are so gentle, so harmonious with all the workings of his own mental faculties, as to insinuate themselves unperceived by the mind of him who is the subject of them. He is wrought upon in such a manner, that he is not able to discriminate between the gracious impulses of the Spirit and his own mental acts.

* *Barnes' Notes*, 2 Cor. v. 17.

And if the reader be disposed with Nicodemus to ask, "How can these things be?" it may be well for him also to recall the answer which the Divine Master gave to that hesitating inquirer. If he cannot understand such earthly things as the action of the ether waves in producing the sense of light within his brain, he should not marvel if he cannot comprehend such heavenly things as the mode in which the eternal Holy Spirit affects the soul of man. In each case the *way how* is a mystery, but the fact is as clear and certain in the one as it is in the other.

## ANALOGY XVI.

*As the light of the Sun of nature, falling upon defective organs of vision, is obstructed and fails to confer its full advantages—so the light of the Sun of Righteousness, falling upon perverse minds, is opposed and fails to impart the fullness of its blessings.*

### Phenomena.

We have already described the structure of the eye, and seen that it is a very complicated organ; that it is composed of numerous parts admirably adjusted to one another, and that it is endowed with sensibility of extreme delicacy to receive impressions from the most refined and ethereal element in nature.* It is, therefore, an organ easily injured or deranged; no organ in the body, perhaps, is more so. It is subject to a vast number of diseases within itself, and is exposed to an endless variety of accidents from without. Hence it is no uncommon thing to meet with persons laboring under the inconveniences of a defective vision, or even with such as mourn its total and final extinction.

*See Part II., Analogy 4.

The *mental vision*, also, is one of great refinement and sensibility, and subject to injuries and derangements as numerous in kind and as various in degrees as those of the eye. Like that organ, it is the seat of inherent diseases and liable to extraneous infections. It may be, and often is, perverted, or blunted, or even extinguished. The light of truth may shine upon it in all its power and purity, but through the influence of erroneous education, of evil associations, or of pride, ambition, lust, avarice, or habits, it may form false judgments, embrace unsound principles, and, like the blind, pursue paths that lead to inevitable ruin. The mental vision of man may be, nay, often has been, so warped and dimmed as to call evil good, and good evil, and to lead him to believe that he did God service, while, in fact, he was acting in open and violent rebellion against him.

Between bodily vision and mental vision, therefore, there is a clear and striking parallel, and one which the Great Master employed to convey moral lessons of the greatest importance. "The light of the body is the eye; if therefore thine eye be single, thy whole body shall be full of light. But if thine eye be evil, thy whole body shall be full of darkness. If therefore the light that is in thee be darkness, how great is that darkness!" From the facts in the case, therefore, and from the use thus made by the Divine Teacher of those facts, we are warranted in employing the various conditions in which the bodily eye is found as typical representations of corresponding conditions of the mental or moral eye.

First, then, we direct the reader's attention to the Sound Eye. By a sound eye we mean, of course, one whose parts all are perfect in form, right in position, and healthy in action, and such as presents to the mind a distinct and correct representation of both the forms and

colors of the objects to which it is directed. When the eye is thus sound and healthy, its owner can see clearly far and near; can discern the true outlines, the real color, and the comparative size and distance of whatever may lie before him. He derives from the light of the Sun all the convenience and pleasure it was designed to impart. "His whole body is full of light"—that is, all the members of his body enjoy the advantages of light; his hands and his feet are guided and governed by the light. The man of clear vision knows what he is doing and whither he is going; discerns what is safe and what is dangerous in the way before him. He never stretches out his hand to lay hold upon what he deems a support, and finds that he grasps but the empty air; never moves forward, thinking himself on level and safe ground, and discovers that he has advanced but to fall into a pit, or to plunge over a precipice. Nothing presents itself to him in an unreal shape, or in a false color, or in a wrong position. All scenes, all objects, all persons appear just as they are, and just as they lie beneath the pure light of the Sun.

Like unto this is the *mental vision* of him "who has been made light in the Lord"—of him "the eyes of whose understanding have been enlightened to know what is the hope of the calling of God, and what the riches of the glory of his inheritance in the saints, and what is the exceeding greatness of his power to usward who believe, according to the working of his mighty power which he wrought in Christ." Such an one receives and enjoys the full benefits of the light of the Sun of Righteousness. As described under the preceding analogy, he rightly understands the law of God, and rightly apprehends his own character as a sinner, and the character and offices of Christ as the Saviour of the world. The doctrines of the Gospel are to him, not dull and misty notions, but

truths, divine truths, full of meaning, full of interest, and deserving of full and implicit faith. Jesus is to him, not a fictitious character, but a present living Saviour; and heaven and hell are no phantoms, but solemn and eternal realities. The sight of his mind, the eye of his faith, apprehends these truths *as clearly* as the sight of his body discerns the material objects around him; aye, and it moves and directs and controls him, too, just *as powerfully.* Were the Christian to see the Son of God expiring on the cross for his sins, what more could the sight effect than to lead him to abhor himself, to hate his sins, and to yield himself a living sacrifice to his crucified Lord? Were the glories of eternity unveiled to his eye, and the bliss of heaven presented to his sight, what more could the view effect than to lead the soul to seek its portion above, to slight the trifles of time, and to feel and act as a pilgrim upon earth? Were the scenes of eternal judgment, or the dark prison of eternal misery presented to his sight, what could it effect more than to impel him earnestly to flee from the wrath to come, and to prepare to render his last account? Or, were a dying Saviour, a blissful heaven, the awful judgment throne, and a miserable hell presented *together* to the Christian's view, what more could the sight effect than to incite him so earnestly to flee the dreaded evil, so devoutly to seize the proffered good, that, compared with this, health and liberty and friends and life itself should seem things of no account in his esteem? This, all this, the *clear vision* of the renewed and enlightened mind does. All this, faith, the *eye* of the soul, has done, and done, not only in a solitary individual here and there, but in millions of instances, and is now doing in millions more. It is thus that the sound mental eye secures to man all the blessings of the light of the Sun of Righteousness. He sees things below and things

above, things temporal and things eternal, in their true light, and discerns their true value and importance. To him, therefore,

> "All, all on earth is shadow, while all beyond is substance:
> And how solid all where change shall be no more!"

The eye, as just stated, is found in many persons in an imperfect condition, one or more of its parts being defective in form, or in texture, or in position. The first of these that we shall notice is

THE NEAR-SIGHTED EYE. In the perfect eye, the rays of light which enter it from a particular object converge and meet exactly on the retina, or nervous lining which covers the interior of the back part of the ball, and there form a perfect and distinct picture of that object. But in the short-sighted eye, these rays meet, or come to a focus, before they reach the retina, and in consequence produce a blurred or obscure picture thereon. This may happen from any one of three causes—from too great a curvature in the cornea, or the transparent part of the front of the eye; from the crystalline lens being too convex; or, from the ball of the eye being of too great a depth. Some are born with one or other of these defects; in others they result from the effects of disease, and in others still they are brought on by excessive use of the eye, such as study. Observations made in different countries of Europe have proved that the cases of near-sightedness increase rapidly in number among scholars, as they advance from the primary schools to those of higher grades, and then through the successive years of study which compose the courses of the universities. By whatever cause produced, this defect of the sight, which the scientific call *myopia*, is a great misfortune.

Near-sighted persons can see objects distinctly only at

short distances; removed a little further, and the outlines become blurred and their colors confused. No matter how brightly the Sun may shine, all appear as if wrapped in haze or mist. In consequence, scenes and objects that are more or less remote—the expression of the eyes and countenance of the orator on the stage, the finished sculpture on the elevated pedestal, the life-like scenes on the painted ceiling, the grace and hues of the spreading oak or towering pine, the varying tints and features of the outstretched landscape—have but little charm, or beauty, or attraction for those who labor under this defect of vision, for they cannot discern them. They are, therefore, chiefly occupied with what is near at hand, and most deeply interested in what is immediately before them.

Now many persons there are whose *mental vision* may be aptly compared to this near-sighted eye. They do not see, they do not look to objects or events that are at a distance in advance. Not that they have by birth inherited this mental myopia, but have contracted it. It has been brought on by the force of worldly passions and pursuits. The eyes of their mind have been so long and so habitually directed to present things, to things that immediately interest or affect them, that they have left neither the power nor the inclination to look away to those that are ahead. The events of the future—death and the grave, judgment and eternity, heaven and hell—are all enveloped to them in the thick haze of distant time. No matter how clearly the light of the Sun of Righteousness reveals them, they fail to make any distinct or influential impressions on their mental retina. They can discern nothing that should alarm them, nothing of importance or of interest in them, that they should immediately and earnestly devote themselves to a prepa-

ration to meet them. They, therefore, in spite of all light and counsel and entreaty, continue engrossed with present things, and neglect the great salvation.

The second defect in the organ of sight, to which we direct the reader's attention, is that of the COBWEBBED EYE, or what oculists term *Muscæ Volitantes*, two Latin words which signify Fluttering Flies, which the defects somewhat resemble. This, also, is a disease or imperfection brought on by various causes, and consists partly in turgidity of some of the minute blood-vessels, and partly in some affection of the humors of the eye. These create the appearance of black specks and tangled cobwebs floating in the air before the sight, and which are particularly conspicuous when the eye is directed to any white surface, or to the clear sky. They are not fixed either in their number, or form, or position, but swim about in varying shapes and relations. Sometimes many of them will fall together, and form in the field of vision a dark cloud of more or less extent, which greatly obscures the sight of all objects behind it. These black spots and dark cobwebs are ever present with the person whose organs are afflicted with them. The brightest sunbeams will neither banish nor dissipate them. When he reads, or when he writes, they advance and retire along the lines with the motion of the eye. Go where he may, do what he will, they are ever before him, blurring what is bright and hiding what is delicate or minute.

Defects very similar to these are found established in the *mental vision* of not a few, and which are the more to be deplored as they are of their own procuring. In the cases to which we refer, the "muscæ volitantes" are the pleasures, the riches and the honors of the world. These, like swarms of glittering flies, or webs of silvery

fibres, are forever fluttering before their eyes, blurring even the sacred page when they would read it, and casting their darkening shades over their spiritual prospects when they would contemplate them. Shine the Sun of Righteousness never so brightly around them, and reveal he never so clearly interests infinitely more important, *these* are ever and anon before their minds. Trivial in value and transient in duration as they are, yet they are sufficient to obscure, if not altogether hide, concerns of far greater moment. Each star in the canopy above, astronomers tell us, is a magnificent globe, a globe of light, a sun shining upon other worlds as our sun shines upon this world; yet the finest silken thread stretched across, or a speck of dust resting upon the object glass of a telescope directed to one of these, is sufficient to completely cover and hide it from view. Just so, a speck of earthly gain, or a cobweb of earthly honor, before the mind's eye, is sufficient to hide from many a man all the glories of the heavenly world.

The third ocular defect, we wish to notice, is that of the COLOR-BLIND EYE. It has been discovered, within comparatively few years, that there are many persons who have not the power of distinguishing colors; in other words, in whom the nerve of vision is affected in one and the same way by rays of light of various colors, or even of all colors. For example, such persons perceive no difference between *red* and *green;* these two colors excite precisely the same sensation in the retina. Hence they cannot distinguish, by their colors, the red cherries from the green leaves on the tree. And all colors into which a considerable proportion of red enters are to them sombre tints.

Dr. Dalton, an Englishman, the first person who drew attention to this subject, was himself afflicted with this

infirmity. He could perceive only two distinctions of color in the whole solar spectrum; so that the gorgeous rainbow appeared to him only as a tame arch of yellow and blue. Specimens of claret-colored cloth he pronounced of the same hue and shade as mud. A florid complexion he compared to a dull blackish blue on white ground. And when he mounted his scarlet gown at Oxford, he declared it to be to him exactly of the same color as the grass of the field. Another gentleman, on being requested to pick out all the *greens* from a number of pieces of stained glass, at once selected the red, brown, claret, yellow and pink; and when asked to say which was the most intense green of the group, he unhesitatingly fixed upon the claret. Wider mistakes still have sometimes unwittingly been committed by persons subject to this imperfection of sight:—An upholsterer once sent his clerk to purchase some black cloth to cover a coffin, who returned with a quantity of scarlet cloth, under the impression that it was as sorrowful a sable as the occasion required.

Having examined no fewer than 1154 persons in the city of Edinburgh, Professor Wilson found that one person in every eighteen was to a certain extent color-blind, one in fifty-five confounding red with green, one in sixty confounding brown with green, and one in forty-six confounding blue with green. And a few cases occurred in which no color was perceived but *black* and *white*, or *light* and *shade*.

To all these the face of nature, in all her departments, must appear far inferior in splendor and variety to that which we behold; and as for those who are totally destitute of the sensation of difference in color, the world must present to their eyes what we should be disposed to call a gloomy, if not a hideous, monotony—light and

shade only revealing the forms of objects as in a mezzo-tint engraving. But here, as in a thousand other arrangements of providence, there comes in a relief—what they have never known they never miss.

This peculiar defect of the corporeal eye, also, has its clear counterpart in the *mental eye* of not a few. Without investigation and without experiment, we discover varied and plentiful evidence that their sensibility to moral hues and colors is sadly defective—that they see not the deformity of sin, nor the beauty of holiness—that they discern not the loveliness of the "Rose of Sharon," nor the grace of the "Lily of the Valley,"—that they appreciate not the glowing pearl set before them in the Gospel—that they perceive not the crimson blood that freely flows on Calvary—that they are insensible to the charms and beauties of the "Bow of Peace," with which infinite love has spanned and cheered their firmament. Eyes they have, but they see not the excellency of the grace, nor the glory of the prospect, which the light of the Sun of Righteousness clearly reveals to the vision of others.

The fourth defect we name is the JAUNDICED EYE. In the preceding case, the eye is destitute of power to discern the colors which belong to objects; in this, it imparts to them a color which they do not possess. In certain morbid conditions of the liver, the bile enters into the circulation of the blood, and is thus diffused through the whole system, and gives to its surface a saffron complexion. This coloring matter of the bile finds its way even into the humors of the eye, and colors them; and objects seen through these now yellow fluids appear as if viewed through a piece of yellow stained glass. In this condition the stained eye lends its own tinge to whatever scene or object it beholds. Bright and pure the sun-

light may be, but to such an one the green fields and blue sky, the leaves of books and the countenances of friends, are all yellow. And this results from a disease of the body.

Diseases of the soul produce similar effects upon the mental eye. *Ambition* is one of these diseases. Where this becomes the ruling passion, as in an Alexander, a Cæsar, or a Napoleon, the man views everything, estimates everything, through the red eye of war and conquest;—peaceful and industrious populations are to him but means for raising armies, fruitful districts but fields for foraging, forests but materials for building forts or fleets, noble plains but arenas for battle, and valleys and defiles but localities for attack and stratagem. His raging mental disorder thus imparts its own dreadful hue to all that comes before his view. *Envy* is such another disease. It has passed into a proverb that the man under the dominion of this hateful passion is ever looking through the "green eye" of pining desire and ill will upon the possessions, or advantages, or successes of others, deeming himself more deserving of such favors than those who enjoy them. *Avarice* is yet another such disease, which imparts its peculiar hue to the mind. The avaricious man's craving love of riches associates every scene and object and event that he witnesses with "gain," or "accumulation." Lead him to the banks of the majestic Mississippi, and his first thought will be, "What a capital channel for traffic!" Place him in full view of the sublime Falls of Niagara, and the first exclamation you hear is, "What an excellent water-power!" Or, if half a city is reduced to ashes, you will hear him soliloquize, "This will advance the price of my goods." Or, if a neighbor dies, in the secret chamber of his soul he is whispering, "Some of his customers will now come to me." His mind

is thus suffused with the love of riches, and his eyes are tinged with the hue of gain, and in this light only can he view anything. So of *Gluttony*, and so of *Lust*. Thus each disease of the soul, like jaundice in the body, imparts its peculiar coloring to the mental vision, and the man laboring under it, sees nothing, estimates nothing, as the true and clear light of the Sun of Righteousness exhibits it to sound and pure minds.

A fifth ocular defect we have in the CATARACT EYE. This disease lies in that part of the eye called the *crystalline lens*, which, in its natural and healthy condition, is perfectly clear and transparent. But it frequently happens, especially in elderly persons, that this transparent substance undergoes a change, and gradually assumes a milky or whitish appearance. This change goes on for a shorter or longer period, the lens growing more and more opaque, until at last it becomes entirely impervious to the light. When this takes place in both eyes, the result is total blindness—a calamity of which no better description can be offered than that given by one who experienced it:

> "O loss of sight! . . . With the year
> Seasons return, but not to me returns
> Day, or the sweet approach of ev'n or morn,
> Or sight of vernal bloom, or summer's rose,
> Or flocks, or herds, or human face divine;
> But clouds instead, and ever-during dark
> Surrounds me, from the cheerful ways of men
> Cut off, and for the book of knowledge fair
> Presented with an universal blank
> Of nature's works, to me expung'd and ras'd,
> And wisdom at one entrance quite shut out."—*Milton.*

Sad as is such a state, it is emblematic of one still more so. There is a cataract condition of the *mental eye* as well as of that of the body. As the process of opacity advances in the crystalline lens, a dark and darkening veil is drawn over the world; the fair face of nature

fades from view; every object becomes more and more indistinct, and ere long altogether obscured. All that can cheer the sight, or guide the hand, or direct the step, now vanishes. So it often befalls the mental vision. The gradual yielding of the heart to the things of time and sense, the gradual neglect of conscience and duty, the gradual growth of unbelief and error, all deepening and intensifying with each successive year, banish the light of truth, the sense of the divine presence, and concern for approaching eternity more and more from the mind, till at length all that was ennobling in contemplation, cheering to the heart, supporting to the hopes, or directive to the conduct, pass away, vanish; and the soul, like one in cataract blindness, is left in utter moral darkness. The firmament of the immortal spirit is now hung with blackness, without hope, and without God in the world. The Sun of Righteousness, indeed, shines on as brightly as ever, but, alas, shines in vain for a soul in such a state!

In one way, and in one way only, can relief be brought to him who is afflicted with a cataract, and that is, by removing from the eyeball the entire substance of the defective lens. Delicate and hazardous as this operation may appear, modern surgery can accomplish it, and restore the sight which has long been utterly quenched. And it is our happiness to know that there is a Physician who can remove the spiritual cataract, and bring to light those who have long sat in darkness and in the region and shadow of death. The blind need but cry, *Jesus, thou Son of David, have mercy on me;* and He need but speak the word, *Ephphatha*, and the miracle of healing is accomplished.

## ANALOGY XVII.

*As the Sun of nature, in passing through the obscuration of an eclipse, discloses physical wonders, which else would have remained invisible—so the Sun of Righteousness, in passing through the darkness of the tomb, reveals Divine Glories, which otherwise would have remained unknown.*

### Phenomena.

A SOLAR eclipse, as every reader knows, is produced by the interposition of the moon, her dark globe coming between us and the Sun, and thus hiding from us a part or the whole of his luminous disc. Such eclipses of the great orb of day are of frequent occurrence; the greatest number of them that can take place in one year is *five*, and the least *two;* but all eclipses of the Sun are not visible from any one place on the face of the globe: they are seen only within a narrow strip of its surface, which cannot exceed 180 miles, and usually is only about 150 miles in breadth.

Astronomers divide eclipses into three classes, which are distinguished by very marked differences. The first is the *Partial eclipse;* in this, as the term implies, a portion only of the Sun's disc is covered, and that on one side or the other.

ANNULAR ECLIPSE OF 1836.

Second, the *Annular eclipse.* It is when the Moon intervenes between the Sun and the earth at such a distance from the latter as to make her apparent diameter less than that of the Sun, that this singular phenomenon is exhibited. The whole surface of the Sun

is covered, except a narrow ring around the outside, encircling the dark centre. When the advancing Moon has reduced the ring on one side to a very narrow strip, a peculiar appearance is presented in that part, which looks like a string of glittering beads, as indicated on the left side of the annexed figure; this is supposed to be the effect of irradiation.

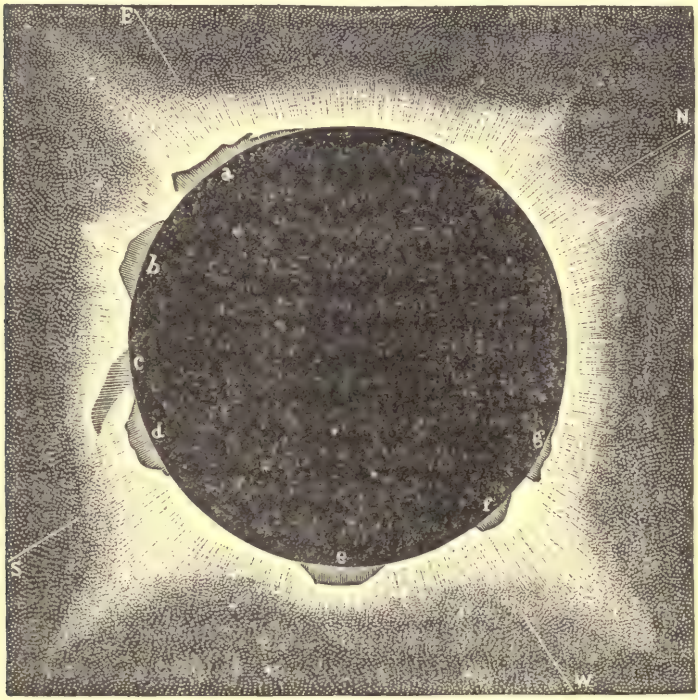
Third, the *Total eclipse.* This occurs when the Moon is nearer to the earth than in the preceding case, and when her distance from us is such that her apparent diameter is sufficient to cover the entire disc of the Sun. This is an event of great interest to the astronomer, both on account of its short duration and rare occurrence. The longest time an eclipse of the Sun can be total is seven minutes; but often it does not exceed three or four minutes. And it takes place at any one locality only at distant intervals; for instance, at London, prior to the total eclipse of 1715, no such phenomenon had been visible for a period of 575 years.

Among all the evolutions of the creation, visible to us, no occurrence is more striking or impressive than this. "A total eclipse of the Sun," says Lockyer, "is at once one of the grandest and most awe-inspiring sights it is possible for man to witness. As the eclipse advances, but before the disc is wholly obscured, the sky grows of a dusky livid, or purple, or yellow crimson color, which gradually gets darker and darker, and the color appears to run over large portions of the sky, irrespective of the clouds. The sea turns lurid red. This singular coloring and darkening of the landscape is quite unlike the approach of night, and gives rise to strange feelings of sadness. The Moon's shadow sweeps across the surface of the Earth, and is even seen in the air; the rapidity of its motion and its intenseness produce a feeling that

something material is rushing over the Earth at a speed perfectly frightful. All sense of distance is lost; the faces of men assume a livid hue, flowers close, fowls hasten to roost, cocks crow, birds flutter to the ground in fright, dogs whine, sheep collect together as if apprehending danger, horses and oxen lie down, obstinately resisting the whip and the goad; in a word, the whole animal world seems frightened out of its usual propriety."

Celestial phenomena, also, attend a total eclipse, still more grand and imposing. A few seconds before the commencement of the total obscuration, the stars burst out, and surrounding the dark Moon on all sides is seen a glorious halo, commonly of a silvery white light, which is called the *Corona*. This radiates and extends beyond the Moon to a distance equal to her apparent diameter, and in some eclipses is observed to reach to a much greater distance. This luminous appendage is supposed to be the Sun's atmosphere, which is not seen when the Sun itself is visible, owing to its overpowering splendor. General Myer gives the following description of the Corona, as observed by him from the summit of White Top Mountain, Virginia, 5,530 feet above the level of the sea, this elevated station being chosen in order to escape the smoke and haze which generally prevail in lower regions: "The eclipse presented, during the total obscuration, a vision magnificent beyond description. As a centre stood the full and intensely black disc of the Moon, surrounded by the aureola of a soft bright light, through which shot out, as if from the circumference of the Moon, straight, massive, silvery rays, seeming distinct and separate from each other, to a distance of two or three diameters of the lunar disc, the whole spectacle showing as upon a background of diffused rose-colored light. This light was most intense, and extended farthest, at about

the centre of the lower limb, the position of the southern prominence. The silvery rays were longest and most prominent at four points of the circumference, two upon the upper and two upon the lower portion, apparently equidistant from each other, giving the spectacle a quadrilateral shape." Mr. Farrel, speaking of the same eclipse, as observed from another station, describes the Corona as "composed of an infinitude of fine violet,




SOLAR PHENOMENA OBSERVED IN 1869.

mauve-colored, white, and yellowish white rays, issuing from behind the Moon." Such is the magnificent and ample robe in which the Creator has invested the great central orb of our system.

A total eclipse brings to view another class of phenomena equally marvellous and grand. When the totality of

an eclipse has commenced, close to the edge of the Moon, and therefore within the Corona, are observed various prominences of differing forms, some of them of fantastic shapes, of light red color fading into rose pink, which have been variously called *Red Flames*, *Red Prominences*, *Red Sierra*. These are indicated in the preceding figure at *a*, *b*, *c*, *d*, *e*, *f*, *g*, as they appeared during the eclipse of 1869. In form and position they perpetually vary, like the clouds in our own atmosphere; but in color they are always of a lighter or darker red. These phenomena have been repeatedly observed and carefully studied during the last half century.

In the year 1842, there occurred a total eclipse, which afforded an exhibition of these prominences that engaged the observation and scrutiny of many distinguished astronomers. Schumächer likened some of them to floating icebergs. Baily compared them to Alpine Peaks. And M. Mauvais employed the same comparison as the latter. He had seen a reddish point soon after the Sun was totally obscured. "When fifty-six seconds had passed after the commencement of totality," he writes, "this reddish point transformed itself into two protuberances, resembling two adjacent mountains, and well defined. Their color was not uniform, streaks of a deeper red marking their flanks. I cannot describe them better than by comparing them to distant Alpine Peaks, illuminated by the rays of the setting Sun. One minute and ten seconds from the time of total obscuration, a third mountain became visible to the left of the other two. In color it resembled the others. Beside it were some smaller peaks, all of them well defined. Near the end of the eclipse, they were no less than two minutes of an arc, or more than 50,000 miles, in height."

The eclipse of 1851 furnished a similar revelation.

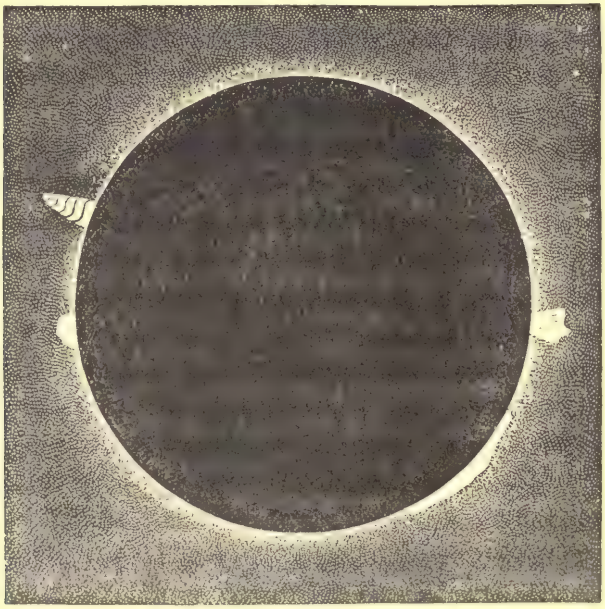
Of this, Mr. Airy, astronomer royal of England, wrote: "The form of the prominences was most remarkable. One reminded me of a boomerang. Its color for at least two-thirds of its breadth—from the convexity towards the concavity—was full lake red; the remainder was nearly white. The most brilliant part of it was the swell farthest from the Moon's limb; this was distinctly seen by myself and my friends with the naked eye. I judged it to be, by its proportion to the Moon's diameter, three minutes (about 80,000 miles) in height. A second prominence was a pale white semicircle based on the Moon's limb. A third appeared as a red detached cloud or balloon of nearly circular form. A fourth was a small conical red mountain, perhaps a little white in the interior. These were the appearances seen instantly after the formation of the totality. Having withdrawn my eye for a moment from the scene, on returning to my telescope, I saw another object of unexpected beauty—an extended *Sierra* had arisen, resembling a rugged chain of mountains. This was more brilliant than the other prominences, and its color was nearly scarlet. The other prominences had perhaps increased in height, but no additional new ones had arisen. The appearance of the *Sierra*, nearly in the place where I had expected the appearance of the Sun, warned me not now to attempt any other physical observations. In a short time the white Sun burst forth, and the Corona and every prominence vanished."

The next total eclipse occurred in 1860, and was visible in Spain. This drew to the field a host of skilful observers, who devoted their best powers to the study of its phenomena. Among them was M. Goldschmidt, who gave the following account of his own observations. "About thirty seconds before totality, I could distinguish

little gray clouds, isolated in part, and floating outside the solar disc at some distance from the edges. One of these isolated clouds of a round form, and another of an elongated form which touched the exterior edge of the Sun, were observed to be of gray color on the ground of the sky, which was a little brighter. An instant afterwards the pyramidal cloud became more clear, and then rose-colored. I had thus been present at the formation of a protuberance. Several smaller prominences were seen in the neighborhood of this one, resembling globules of mother-of-pearl, but of an irregular form. These likewise became of a rose-color immediately afterwards, but quickly disappeared. The most imposing as well as complicated of the prominences—which I will call the Chandelier—was grand beyond description. It depended from the lower limb, appearing like slender tongues of fire, and of a rose color; its edges were purple and transparent, allowing the interior of the prominence to be seen; in fact, I could see distinctly that this prominence was hollow. Shortly before the end of the totality, I saw escape from the extremities of these rose-colored and transparent sheaves of light, a slight display in the shape of a fan, which gave to the protuberance a real resemblance to a *chandelier*. Its base, which at the commencement of the totality was noticed very decidedly on the black limb of the Moon, became slightly less attached, and the whole took an appearance more ethereal and vaporish; however, I did not lose sight of it for an instant. The jets of light which came from the extremities disappeared with the appearance of the first rays of the Sun; but it was not so with the protuberance itself; this continued visible for some time longer. The height of the prominence was estimated to be 95,000 miles. I observed several other prominences to the right of

this, one of which was of about the same height; and one had the appearance of a rose-colored cloud, floating on the Corona, like a red cloud at sunset."

August 18th, 1868, brought round another total eclipse of the Sun, visible in Arabia and India. The most remarkable of the solar prominences observed at this time was an enormous spiral cone, or horn, as some termed it. This sprang from the north side, and rose to

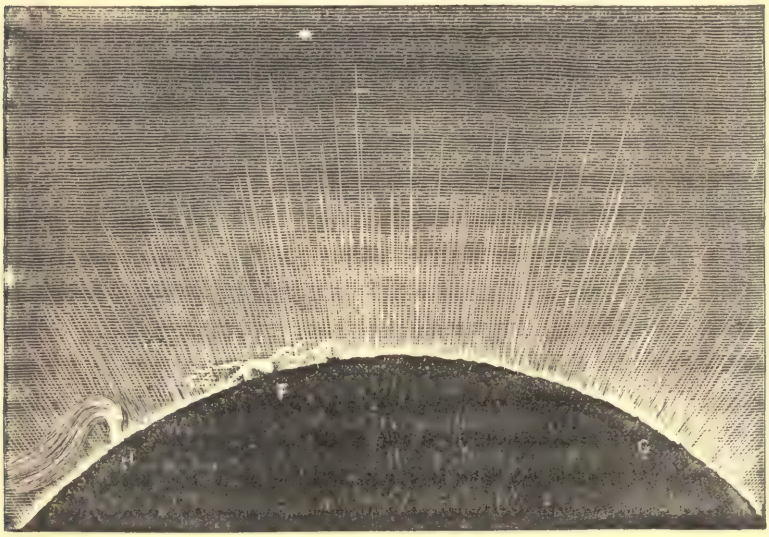


SOLAR ECLIPSE OF 1868.

the height of three minutes and eighteen seconds, or 88,900 miles. The weather on this occasion being unfavorable at several stations, many expectations were disappointed.

Within one year from the foregoing, namely, on the 7th of August, 1869, there occurred another eclipse, visible in North America, during which many interesting observations were made. The following account was given

by Mr. G. H. Knight, of that portion of the Sun's circumference to the observation of which he devoted himself. On this occasion, he studied the prominences with a telescope magnifying 120 times. "We have only two precious minutes!" he says, "and leaving our new acquaintances—Mercury, the sombre woods, the leaden sky, the inky river—to other observers, we direct our 120 magnifier to the red specks, some six or seven in number, now plainly discernible around the Moon's margin.



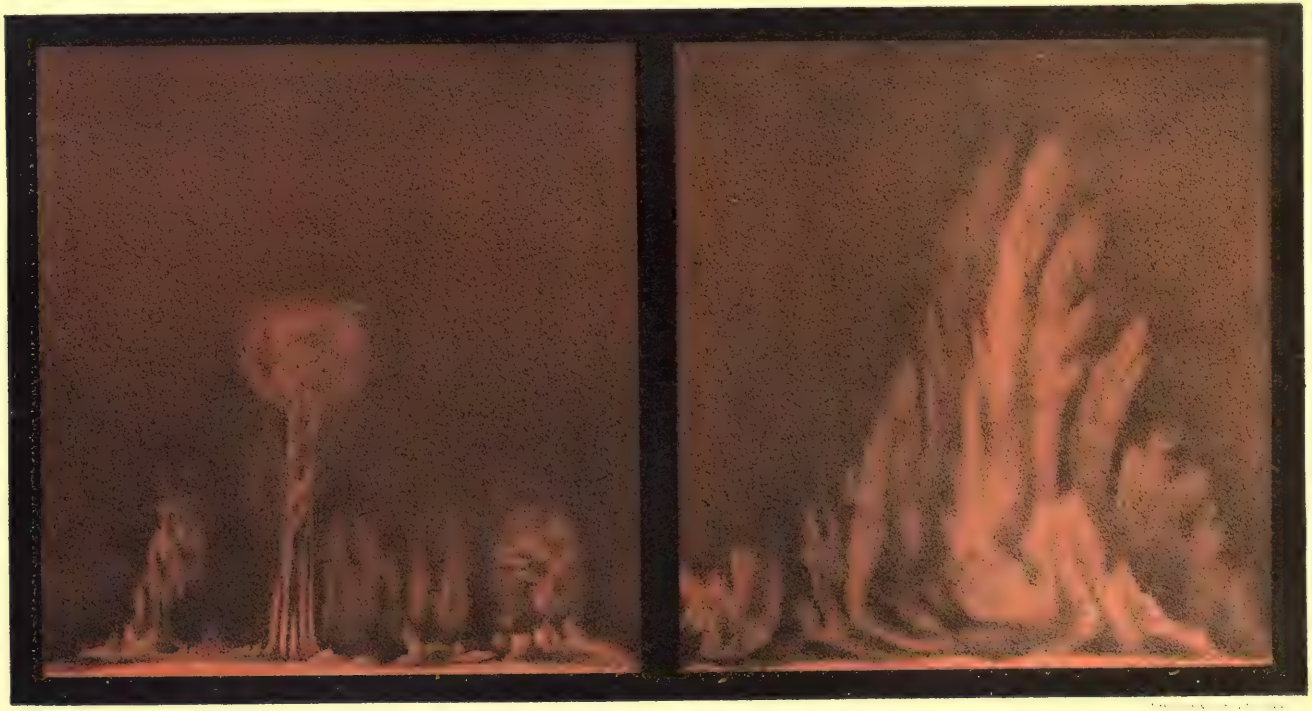

SOLAR PHENOMENA OBSERVED IN 1869.

These appearances, when brought within the field of the telescope, show a surprising individuality, and all, by shape, suggest violent disturbance, whose motions are, however, invisible by reason of the immense distance. The tube is directed to a point, near the Moon's nadir, occupied by the brightest of these lights, as indicated in the annexed figure at G. The apparition seems to radiate from some point hidden behind the Moon's disc, beyond which it emerges in brilliant silver, copper, and

# PROTUBERANCES OF THE SUN

Observed August 29.1869.

Observed October 8.1869



ruby-colored coruscations, the copper tints predominating, and terminates in a circular arc, like a half-set Sun. The impression conveyed to an observer is of a vast explosion from a centre some twenty thousand miles below the edge of the Sun's disc, and extending therefrom about fifty thousand miles in every direction. About 50° of the Moon's circumference from this prominence, we observed a second and a wholly different one, viz., that indicated at F, which bears a grotesque resemblance to a stag's antlers or to the strands of a ravelled rope tossed about by a whirlwind. The shape and coruscations of this apparition suggest electrical action (fancy an electric spark 500 miles thick!), or the deflagration of some liquid metal. Its color is crimson; its height about 20,000 miles. Still another and totally different emanation is seen at H. This wears the resemblance of a horse's tail, or, more nearly, of a puff of smoke drifting northward, and illuminated by the rosy hues of sunset. At this stage of observation some one jogged the instrument, and before it could be adjusted to another group, a glint of sunlight from the disc's right margin blinded our unaccustomed retinas and flooded the landscape with returning day. At the same instant, looking upward, we beheld the Moon's black shadow, *sharply defined as a wall in the air*, sweep majestically away from right to left before our eyes—and the total eclipse of 1869 had become a thing of the past!"

Great changes in the solar prominences, as a rule, take place only very slowly, or quite imperceptibly. In some cases, however, the change in the form of a prominence is so extraordinary, and occurs with such rapidity, that it can only be ascribed to extremely violent agitations in the upper portions of the solar atmosphere, compared with which the cyclonic storms, occasionally agitating

the earth's atmosphere, sink into insignificance. The observation of such a solar storm has been thus described by Lockyer: "On the 14th of March, 1869, about 9h. 45m., I observed a fine dense prominence near the Sun's equator, on the eastern limb, in which intense action was evidently taking place. At 10h. 50m., when the action was slackened, I saw at once that the dense appearance had all disappeared, and cloud-like filaments had taken its place. The aspect presented in Picture I., embracing an irregular prominence, with a long and perfectly straight one, was assumed by 11h. 5m., the height of the prominence being 1′ 5″, or about 27,000 miles. I left the observatory for a few minutes, and on returning at 11h. 15m. I was astonished to find that part of the straight prominence had entirely disappeared; not even the slightest track appeared in its place; and the whole phenomenon had taken the form presented in Picture II."

Professor Respighi is of the opinion that the solar prominences are of an eruptive origin and of a gaseous nature, and that electric action in some form is concerned in producing these eruptions. He observed some prominences that exceeded three minutes, or ten times the earth's diameter, in height; and one prominence that was not less than twenty times the earth's diameter, or 160,000 miles in altitude. He also noticed that the formation of a prominence is usually preceded by the appearance of a rectilinear jet, either vertical or oblique, and very bright and well defined. This jet rising to a great height, is seen to bend back again, falling toward the Sun like the jets of our fountains, and presently the sinking matter is observed to assume the shape of gigantic trees more or less rich in branches and foliage. Gradually the whole sinks down upon the Sun, sometimes forming isolated clouds before reaching the solar surface.

(PICTURE I.)

(PICTURE II.)

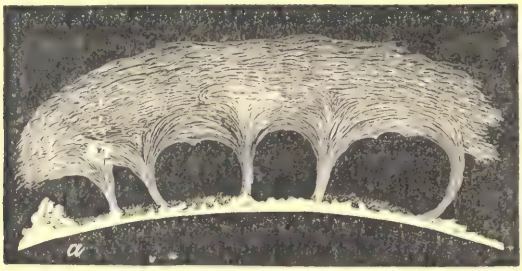
SOLAR STORM OBSERVED BY LOCKYER, March 14, 1869.

It is in the upper portions of such prominences that the most remarkable and rapid transformations are witnessed; but a great difference is observed in the rate with which prominences change in figure. Their duration, too, is very variable. Some develop and disappear in a few minutes, while others remain visible for several days. He considers that the sharply defined bases of the eruptive jets prove that the eruption takes place through some compact substance, forming a species of solar crust. He also holds that the enormous velocity with which these gaseous masses rush through the solar atmosphere implies that the latter is of exceeding tenuity.

Professor Young, of Dartmouth College, America, by means of an instrument called *Telespectroscope*, witnessed the most remarkable outburst from the Sun ever yet seen by man. "On the 7th of September, 1871, between 12.30 and 2 P. M.," he says, "there occurred an outburst of solar energy remarkable for its sudden violence. Just at noon I had been examining with the telespectroscope an enormous protuberance of hydrogen close on the eastern limb of the Sun. It had remained with very little change since the preceding noon—a long, low, quiet-looking cloud, not very dense or brilliant, nor in any way remarkable except for its size. It was made up mostly of filaments nearly horizontal, and floated above the chromatosphere with its lower surface at a height of some 15,000 miles, but was connected with it, as is usually the case, by three or four vertical columns brighter and more active than the rest. Lockyer compares such masses to a *banyan grove*. In length it measured 3′ 45″, and in elevation about 2′ to its upper surface—that is, it was about 100,000 miles long by 54,000 high.

"At 12.30, when I was called away for a few minutes, there was no indication of what was about to happen,

except that one of the connecting stems at the southern extremity of the cloud had grown considerably brighter, and was curiously bent to one side; and near the base of another at the northern end a little brilliant lump had developed itself, shaped much like a summer thunder-head. The annexed figure represents the prominence at




BANYAN GROVE ON THE SUN.

this time, *a* being the little *thunder-head.* What was my surprise, then, on returning in less than half an hour, to find that in the meantime the whole thing had been literally blown to shreds by some inconceivable up-rush from beneath. In place of the quiet cloud I had left, the air, if I may use the expression, was filled with flying *debris*—a mass of detached vertical fusiform filaments, each from 10″ to 30″ long, by 2″ or 3″ wide, brighter and closer together where the pillars had formerly stood, and rapidly ascending. (See Fig. 1, next page.)

"When I first looked, some of them had already reached a height of nearly 4′ (100,000 miles), and while I watched them they rose with a motion almost perceptible to the eye, until in ten minutes the uppermost were more than 200,000 miles above the solar surface. This was ascertained by careful measurement; the mean of three closely accordant determinations gave 7′ 49″ as the extreme altitude attained, and I am particular in the statement because, so far as I know, chromatospheric

matter (*red hydrogen* in this case) has never before been observed at an altitude exceeding 5′. The velocity of ascent also, 166 miles per second, is considerably greater than anything hitherto recorded. A general idea of its appearance when the filaments attained their greatest elevation may be obtained from the accompanying cut (Fig. 1).

Fig. 1.

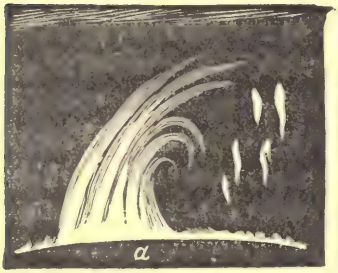



Fig. 2.

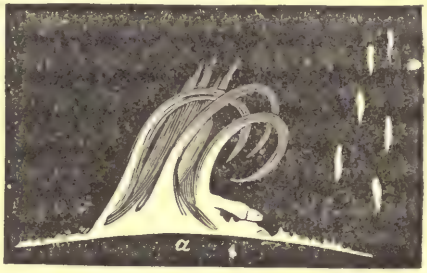
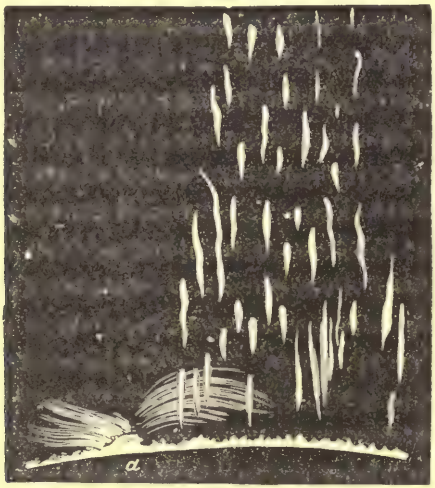



Fig. 3.




EXPLOSIVE PHENOMENA IN THE SUN.

As the filaments rose they gradually faded away like a dissolving cloud, and at 1.15 only a few filmy wisps, with some brighter streamers low down near the chromatosphere, remained to mark the place.

"But in the meanwhile the little *thunder-head*, before

alluded to, had grown and developed wonderfully into a mass of rolling and ever-changing flame, to speak according to appearance. First it was crowded down, as it were, along the solar surface (Fig. 3, *a*); later it rose almost pyramidally 50,000 miles in height; then its summit was drawn out into long filaments and threads which were most curiously rolled backwards and downwards, like the volutes of an Ionic capital (Fig. 2); and finally it faded away, and by 2.30 had vanished like the other. The figures inserted in this paragraph show it in its full development; the former having been sketched at 1.40, and the latter at 1.55.

"The whole phenomenon suggested most forcibly the idea of an explosion under the great prominence, acting mainly upwards, but also in all directions outwards, and then after an interval followed by a corresponding inrush. The same afternoon a portion of the chromatosphere on the western limb of the Sun was for several hours in a state of unusual brilliance and excitement."—*Boston Journal of Chemistry.*

Fr. Secchi, of the astronomical observatory at Rome, sums up the result of his investigations of these solar phenomena as follows:—"The prominences are not mere optical illusions (as once supposed), but real phenomena appertaining to the Sun, being collections of luminous matter of great brilliancy, and possessing a remarkable photographic activity. Masses of this matter are found suspended, at very great elevations, and isolated like clouds in the air. Besides the prominences, a zone of the same material envelops the whole of the Sun's globe. The observation of eclipses *furnishes indisputable evidence* that his sphere is really surrounded by a layer of this red matter, of which we commonly see no more than the most elevated points. The prominences spring from this envelop; they are masses which raise themselves above

the general level, and even at times detach themselves from it. Some among them resemble smoke from the craters of volcanos, which, when arrived at a certain elevation, yields to a current of air, and extends horizontally. The number of prominences is incalculable. When observing the Sun directly, its globe appeared to be encircled with flames; there were so many that it seemed hopeless to attempt to count them. The height of the prominences is very great, especially if we notice that account must be taken of the portion concealed by the moon. Thus estimated, the largest protuberance visible in 1860 was certainly not less than 3′ in height, which corresponds to about ten times the diameter of the earth; the others had a height of from one to two minutes."

Lockyer has since been able to confirm Secchi's theory, that the Sun is wholly surrounded by a layer or envelop of colored matter, whence those stupendous prominences arise; the thickness of this layer he estimates at some 5,000 miles on an average. To these Leverrier adds his testimony in these words: "The existence of a bed of rose-colored matter, partially transparent, covering the whole surface of the Sun, is *a fact established* by the observations made during the eclipse of this year."

Such, in brief, are the marvels in connection with the great orb of day which are revealed to us through the darkness of eclipses, and which but for such conjunctions of the solar and lunar globes would in all probability have remained forever hidden to the inhabitants of the earth. Even with the aid of eclipses, man has, as it were, but just opened his eyes to see these stupendous phenomena, and they are all, as yet, involved to him in great mystery. The Corona and Sierra, the eruptions and flames, the elements that compose them, the forces that impel and govern them, the velocity with which they travel, the

height to which they ascend, and the purposes which they subserve, suggest a multitude of questions which science, at this present, is altogether unable to answer. But with the new instruments and new methods of observation, of late employed, new facts have been rapidly accumulating; and the day may not be far off when much light will be thrown upon all these. In the meanwhile they open up to us the most astonishing views of the Creator's power and plans, of his works and ways. And who can contemplate these stupendous commotions and magnitudes and velocities, which are thus perpetually displayed on the surface of the solar orb, and not be filled with sentiments of awe and adoration! Who but must exclaim, "Great and marvellous are thy works, Lord God Almighty!"

## Teachings.

But these phenomena of the material creation, marvellous as they may appear, are but symbols of more amazing phenomena of grace. As the Sun of nature, in passing through the obscuration of an eclipse, thus discloses physical wonders, which else would have remained invisible, so *the Sun of Righteousness, in passing through the darkness of the tomb, revealed Divine glories which otherwise would have remained forever unknown to man.*

An eclipse of the Sun is not an accident, or chance event, but a necessary and foreseen result of the plan on which the solar system is constructed. Such are the relations of the orbits, distances and velocities of the globes composing it, that each particular eclipse must take place at a set time. Hence the astronomer can foretell the exact date of its occurrence. So, likewise, the eclipse of the Sun of Righteousness in the darkness of the grave was not an accident, not the mere issue of the

Jews' caprice, or of Pilate's cowardice, but a necessary and fore-appointed event in the wondrous *plan* of human redemption—a plan well-ordered and sure in all things. Such was the guilt of man, and such the justice of God, that "there could be no remission of sin without the shedding of blood." According to the determinate counsel and foreknowledge of God, Christ must needs have suffered, and been buried, and risen again from the dead. Accordingly, God beforehand showed by the mouth of all his prophets, that Christ should suffer and die. For this end came he into the world. And having come, when in the course of his ministry the proper period had arrived, "Jesus himself from that time forth began to show unto his disciples how that he must go unto Jerusalem, and suffer many things of the elders and chief priests and scribes, and be killed, and be raised the third day." And with all this fully known—with all the treachery of Judas, the brutality of the Roman soldiery, the rage and malice of the Jews, the scourge and the crown of thorns, the cross, the spear, and the grave, clearly before his view—yet, with a purpose and a step as unfaltering as the movement of the Sun in the heavens, he advanced to meet all, to endure all, to accomplish all, that was appointed of the Father.

As we have already seen, when the dark orb of the moon invades the bright and glorious disc of the Sun, there is cast a dismal pall over all below; man stands in awe, and every living thing comes to a dread pause. So, when the enemy assailed the person of the Sun of Righteousness, and quenched his pure and illustrious life in death, a gloom, an ominous gloom, overspread the sky; the air seemed to be full of foreboding signs; a thrill of tremor passed through the solid earth; the rocks were rent, the graves of the dead were opened; and a sense of

some awful presence, hovering in vengeful witness of the dreadful scene, seized and chilled alike the guilty and the innocent with emotions of dread and horror. Even the hardened centurion and they that were with him feared greatly. And all the people that came together to that sight, beholding the things which were done, smote upon their breasts and returned. And all his acquaintance, and the women that followed him from Galilee, dumb with grief and terror and amazement, stood afar off, beholding these things. And there was darkness over all the land on that great and terrible day of the Lord.

But out of that darkness, as from the hidden sphere of the eclipsed sun, there shone forth wonders and glories which the world had never beheld or known before. Now appeared the *love of Christ for sinful men* with a power and a splendor which eye had not seen, nor ear heard, nor heart of man conceived. Now was displayed love that could face all the scorn and derision of men, and all the malice and cruelty of devils—that could endure the laceration of flesh and veins and nerves and every tender sensibility—that could undergo the torments of burning fever and raging thirst—that could drink the deepest and bitterest dregs of the cup of humiliation and suffering—that could lay his body a living sacrifice upon the altar, and make his soul an offering for sin—and that even dared to encounter the hidings of his Father's face, dearer to him than all the wealth of the universe! O the love of Christ! As a divine halo it glows and radiates around that dark and doleful tomb. Who shall declare it? It passeth all understanding, all the imagination of men and of angels. Dear reader, whosoever thou art, think, oh think, of this love. Hold it in daily grateful recollection. Meditate often upon the divine and pleasing theme. Let every scene on earth and every

orb in heaven remind you and speak to you of the Saviour's love. When you behold the rising hills, or tread the solid rocks, let them call to your remembrance the hill and the rocks which marked and witnessed the conflict of his dying love. When you view the Sun in the brightness of his glory, or gaze upon the midnight sky, and mark the thousands of its glowing fires, then think that He, who fixed them there, once hung on Calvary, that you might shine as a star, as a Sun, in his kingdom, when those stars shall shine no more!

Out of the dark dark scene of Christ's death and burial we also see shining forth, as bright and life-giving beams, the *Propitiation for our sins and the Assurance of eternal life.* As we witness the Holy One of God bowing his head in death, and saying, "It is finished," we see all the claims of Divine Justice against us fully answered, and our justification secure and complete. As we behold him burst the bonds of death, and come forth a conqueror over the tomb, we see the curse of the law removed, aye, and reversed into a glorious triumph. "Who, now, shall lay anything to the charge of God's elect? It is God that justifieth: who is he that condemneth? It is Christ that died; yea, rather, that is risen again; who is even at the right hand of God; who also maketh intercession for us. Who shall separate us from the love of Christ? Shall tribulation, or distress, or persecution, or famine, or nakedness, or peril, or sword? Nay, in all these things we are more than conquerors, through him that loved us. For I am persuaded that neither death, nor life, nor angels, nor principalities, nor powers, nor things present, nor things to come, nor height, nor depth, nor any other creature, shall be able to separate us from the love of God, which is in Christ Jesus our Lord."

Again—As from behind the dark orb of the moon

burst forth the corona and leaping glories of the hidden Sun, so from behind that "great stone," placed on the mouth of the tomb, shine forth the assurance and the pattern of *our own Resurrection to a glorious immortality.* Early on the morning of the first day of the week, even while it was yet dark, that stone, by rejoicing angels, was rolled away, and Jesus rose triumphant over death, hell, and the grave. O blessed morn! O transporting victory! The dark, mysterious eclipse is passed, and the Sun of Righteousness shines again in all his glories. Now is Christ risen from the dead, and become the first fruits of them that sleep. Because he lives we shall live also. As in Adam all die, so in Christ shall all be made alive. He that raised up Christ from the dead, shall also quicken our mortal bodies, by his Spirit that dwelleth in us. Death hath no more dominion over us, nor the grave any more dread to present. "In the tomb of Jesus Christ are dissipated all the terrors which the tomb of nature presents. In the tomb of nature, O sinner, thou beholdest thy frailty, thy subjection to the bondage of corruption: in the tomb of Jesus Christ thou beholdest thy strength and thy deliverance. In the tomb of nature the punishment of sin stares thee in the face: in the tomb of Jesus Christ thou findest the expiation of it. From the tomb of nature thou hearest the dreadful sentence pronounced against all the posterity of Adam, 'Dust thou art, and into dust shalt thou return:' but from the tomb of Jesus Christ issue those accents of consolation, 'I am the resurrection, and the life; he that believeth in me, though he were dead, yet shall he live.' In the tomb of nature thou readest this universal, this irrevocable doom written, 'It is appointed unto men once to die:' but in the tomb of Jesus Christ, thy tongue is loosed into this triumphant song of praise, 'O death, where is thy sting? O grave,

where is thy victory? Thanks be to God who giveth us the victory, through our Lord Jesus Christ.'"*

## ANALOGY XVIII.

*As the Sun of nature, after having been eclipsed, continues to shed its light as before upon the dark and desolate orb of the moon that had invaded its glorius—so the Sun of Righteousness, after His eclipse in the darkness of the tomb, ceased not to pour His gracious light on the ungrateful race that had crucified and slain Him.*

### PHENOMENA.

IGNORANCE is the mother of superstition and fear; it fancies shadows to be realities, peoples darkness with evils which have no existence, and interprets a thousand things to be ominous of danger where no danger is. Before the nature and true causes of eclipses were understood, these phenomena were regarded as supernatural events, and viewed with apprehension and alarm. It was believed that they were produced by the immediate interposition of God, as a token of his displeasure. When the Sun was totally eclipsed, it was imagined, by many of the ancients, that he turned away his face, in disapprobation and abhorrence of some atrocious crime that had been committed, or was about to be perpetrated on the earth, and threatened mankind with everlasting night. History abounds with illustrations of this in every age, and nearly in every land.

When the Medes and Persians, several centuries before Christ, had engaged in battle, and just as the combat was growing warm, there occurred a total eclipse of the Sun. "Day," says Herodotus, "was on a sudden changed into night. At this, both armies were so alarmed that they

* *Saurin*, Sermon LXXIII.

ceased fighting, and were alike anxious to have the terms of peace agreed on."*

Herodotus relates a similar occurrence in connection with Xerxes, on his expedition against Greece. "At the moment of departure from Sardis, the Sun suddenly quitted his seat in the heavens, and disappeared, though there were no clouds in sight, but the sky was clear and serene. Day was thus turned into night; whereupon Xerxes, who saw and remarked the prodigy, was seized with alarm, and sending at once for the Magians, inquired of them the meaning of the portent. They replied: 'God is foreshowing to the Greeks the destruction of their cities; for the Sun foretells to *them*, and the moon for *us*.' So Xerxes, thus instructed, proceeded on his way with great gladness of heart."

When the fleet of Pericles, the celebrated Grecian, was preparing to attack Peloponnesus, there happened an eclipse of the Sun, which was considered a most unfortunate omen; and all the Athenian commanders, together with their whole force, were thrown into the greatest consternation.

Ignorant and uncivilized nations still look upon eclipses as omens of evil, and connect various superstitions with their occurrence. The Hindoos, relates Lockyer, when they see the black disc of our satellite advancing over the Sun, believe that the jaws of a dragon are gradually eating it up. To frighten off the devouring monster, they commence beating gongs and rending the air with discordant screams of terror and shouts of vengeance. For a time their efforts have no effect; the eclipse still progresses. At length, however, the uproar terrifies the

* This eclipse is said to have been foretold by Thales, and several different years have been assigned as its true date. Recent calculations made by Oltmanus, from the newest astronomical tables, put it in the year 610 B. C., and this agrees with all the conditions of the event.

voracious dragon; he appears to pause, and, like a fish that has nearly swallowed a bait and then rejects it, he gradually disgorges the fiery mouthful. When the Sun is quite clear of the monster's jaws, a shout of joy is raised, and the exultant natives congratulate themselves on having, as they suppose, saved their deity from a disastrous fate. Elsewhere in India, the natives immerse themselves in the rivers up to the neck, which they regard as a most devout position, and thus seek to induce the luminary which is in process of eclipse to defend itself against the dragon.

Similar notions prevail in other parts of the world. The following description of the effects produced by a solar eclipse on the inhabitants of Barbary is given by Mr. Tully in his *Letters from Tripoli*—"I cannot here omit describing what an extraordinary impression an eclipse makes on the uninformed part of the inhabitants of this country. Of this we had ocular proof during the great eclipse of the Sun, on the fourth of this month, which occasioned, for some minutes, a gloomy darkness, resembling that of midnight. The darkness was at its height by half-past eight in the morning. The screech-owl, not long retired to its rest, reappeared, and disturbed the morning with its shrieks. Lizards and serpents were seen prowling about the terraces; and flights of evening birds, here called marabats, and held sacred by the Moors, flew about in great numbers, and increased the darkness. The noisy flitting of their wings roused the Moor, who had been stupefied by fear; and when one of these heavy birds (which often drop to the ground by coming in contact with each other) chanced to fall at his feet, the African would start aghast, look at it with horror, and set up a hideous howl. About 8 o'clock, when the lustre of the morning was completely faded,

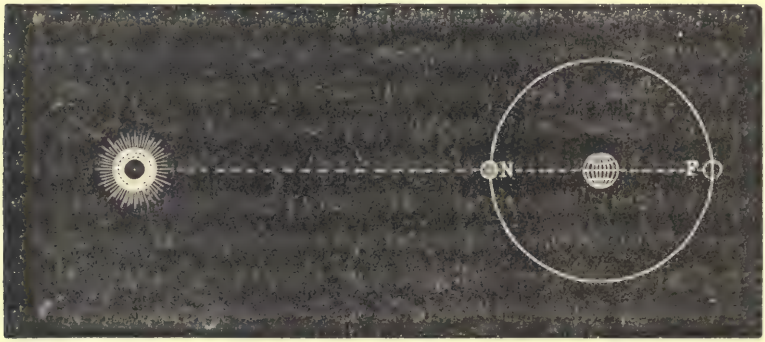
the common Moors were seen assembling in clusters in the streets, gazing wildly at the Sun, and conversing very earnestly. When the eclipse was at its height, they ran about distracted, in companies, firing volleys of muskets at the Sun, to frighten away the monster or dragon, as they called it, by which they supposed it was being devoured. At that moment, the Moorish song of death and *walliah-woo*, or the howl they make for the dead, not only resounded from the mountains and valleys of Tripoli, but was undoubtedly re-echoed throughout the continent of Africa. The women brought into the streets all the brass pans, kettles, and iron utensils, they could collect; and striking on them with all their force, and screaming at the same time, occasioned a horrid noise, that was heard for miles. Many of these women, owing to their exertions and fears, fell into fits or fainted. The distress and terror of the Moors did not in the least abate, till near 9 o'clock, when the Sun assured them by his refulgent beams, that all his dangers were passed."

Such exhibitions of ignorance and superstition, while they are melancholy to contemplate, should inspire us with gratitude for the light and advantages we enjoy in a land where science is cultivated, and Revelation has dispelled the darkness and absurdities which envelop the heathen parts of our world. We know that no dragon or any other monster can ever attack or approach the great orbs of heaven. And, from the nature of eclipses, which we thoroughly understand, we are also well assured that these phenomena are no more to be interpreted as tokens of divine displeasure than are the yearly recurrence of the seasons, or the regular return of the tides of the ocean. We know, moreover, that even the Moon, the true cause of solar eclipses, has no power whereby she can affect the intrinsic brilliancy of the

great Fountain of Light, that glorious orb being more than ninety millions of miles above and beyond the reach of her influence. The Sun, in reality, loses nothing of his native lustre during the greatest and most protracted eclipse that can occur; but is even then all the while diffusing streams of light around him in every direction, and illuminating without intermission all the planetary bodies of the system, and even the opposing sphere of the Moon herself. As soon as this little lunar speck, which for a few moments intercepts the Sun's rays, is out of the way, his beams flood the earth with light as brilliant and abundant as ever. He has suffered nothing by the interposition.

One obscuration of the Sun, indeed, there has occurred, which we are taught on the highest authority to ascribe to the immediate agency of the Great Ruler of all. The event is distinctly recorded by no less than three independent historians. It took place at the supreme moment of all time—that of the *crucifixion* of our blessed Lord and Saviour. These are the words in which it is related by the evangelist St. Luke:—"And it was about the sixth hour, and there was darkness over all the earth until the ninth hour: and the Sun was darkened." From the explanation before given of the nature and cause of solar eclipses, it is evident that this darkness must have been supernatural. It could not have been a natural eclipse of the sun; for it happened at the time of the Jewish Passover, and that festival, by the appointment of the law, was to be celebrated at the full Moon, when it was impossible, according to the established laws of nature, that an eclipse of the Sun could take place. This will be apparent by reference to the annexed figure. An eclipse of the Sun occurs at the *new moon*, or when it is at N, directly between the earth and the Sun. But

at this time the Moon was full, and at F, or the furthest possible point in her orbit from that of a solar eclipse. To all this we may add, that in a total eclipse of the Sun, the continuance of total darkness can never be more than seven minutes, and most commonly does not exceed three or four minutes; but the darkness which overspread the earth while the Redeemer hung upon the cross, prevailed without intermission for full three hours. In confirmation of what has now been stated, we may further just mention the interesting fact, that astronomers, by calculating backwards, have discovered that an eclipse of the Moon, which can only take place at the




POSITION OF THE MOON AT A SOLAR ECLIPSE.

full, happened on the evening of that ever memorable day on which the Saviour was crucified. And so it came to pass, according to the words of the prophet, that "The Sun and the Moon were both darkened in their habitation, on that day."

## Teachings.

Now, as the Sun of nature, after having been eclipsed, comes forth again as brilliant as ever, and continues to shed its light as before on the earth, and even on the dark and desolate orb of the Moon that had invaded and obscured its glories,—so the Sun of Righteousness, after having been rejected of men, and been laid in the dark-

ness of the tomb, came forth the same Divine and Glorious Being, *and continued to pour his gracious light upon our ungrateful race, and even upon those who with wicked hands had crucified and slain Him.*

The intercepting globe of the Moon, as just stated, has no power to abate, or alter, or in anywise to affect the intrinsic glories of the Sun—that vast and resplendent orb being immeasurably above and beyond its puny influence; so neither had the rage and mockery, the insults and cruelty of the Jews any power to change the mind or heart, the purpose or the disposition, of the adorable Son of God as the Saviour of men. Though they had rejected his messages of mercy, and met the overtures of his compassion with the frowns of hate and execration, and finally requited all by his murder upon the ignominious cross, yet none of these things moved him from his purpose of love and mercy toward them. He still pitied them, still stood ready to pardon and to save them.

As the only effect which the interposition of the moon has upon the Sun is to render him apparently all the brighter, by the contrast, when the eclipse is over, so the only influence which the vile ingratitude and malice of the Jewish rulers had upon the benign Sun of Righteousness was to quicken his love and mercy toward them, and to hasten his efforts to save them from the destruction toward which they were rushing. The offer of salvation through his atoning blood was to be made *first* to those who had so cruelly shed that blood. He commanded his disciples "that repentance and remission of sins should be preached, in his name, among all nations, *beginning at Jerusalem.*" O wondrous grace and mercy —BEGINNING AT JERUSALEM! After all the ingratitude that had pierced his loving heart—after all the unutterable

sufferings of the cross and humiliation of the grave, "yet no sooner does he find himself in a capacity to bless, than he exercises the prerogative in blessing them. We might almost as soon have expected that he would have sent his gospel to be proclaimed over the mouth of perdition as to Jerusalem, the hell of earth. At least, we should have expected to see it making the circuit of the earth before it came there; or to hear him directing his apostles to wait till his immediate enemies had descended to the grave—to visit Jerusalem last. But the course of his grace admits not of human calculation; for he sends them to Jerusalem first. While the eyes of his enemies are yet gleaming with the fire of triumphant revenge, he commissions his apostles to hasten and open the charter of redemption within sight of Calvary; to let them know that, whatever they might have drawn from his heart, his love for them remained there still." *

Unparalleled as this act of grace toward Jerusalem is, yet it is but a type of his boundless benevolence toward the world at large. Though he well knew, and could clearly foresee, that all coming generations of men, to the end of time, would display a similar spirit to that of the Jews—that the carnal mind in every land would virtually re-enact the ignominious scenes of Calvary—that multitudes in every age "would crucify the Son of God afresh," and put him to an open shame—that the kingdoms of this world would set themselves against him and against his cause—that those who would become his disciples would be hated and hunted and slain for his name's sake—yet, with all this wickedness of spirit and all this widespread guilt lying distinctly before him, he commissioned his disciples to carry the Gospel to all

* *The Great Teacher*, p. 282.

nations, and to deliver the message of his love to every creature.

Adorable Son of God, what divine benevolence we behold in thee! What unquenchable love! What a triumph of ineffable mercy over human ingratitude and sin!

"O for this love, let rocks and hills
Their lasting silence break,
And all harmonious human tongues
The Saviour's praises speak.

"Yes, we will praise thee, dearest Lord,
Our souls are all on flame;
Hosanna round the spacious earth,
To thine adored name.

"Angels, assist our mighty joys,
Strike all your harps of gold;
But when you raise your highest notes,
His love can ne'er be told."

# PART THIRD.

## *THE SUN AS THE SOURCE OF HEAT.*

### ANALOGY I.

*As the Solar Orb is the fountain from whence the whole system of nature derives its vivifying heat—so Christ, the Sun of Righteousness, is the Source from whence the whole system of revealed religion derives its spiritual vitality.*

#### PHENOMENA.

IN the course of the preceding Analogies we have seen that the Sun, as the fountain of light, is a great and marvellous orb, presenting the most sublime displays of the Creator's wisdom and power, and offering the most instructive types and illustrations of the offices and character of the Sun of Righteousness, as the Saviour of the world. And, in this division of our subject, we shall find that Orb, as the central *Source of Heat* to the system of nature, to be equally interesting and instructive in regard to the same divine subjects.

The globe upon which we dwell derives all its heat from the Sun, and upon the incessant flow of his warm rays depends the continued existence of all the organized beings, plantal as well as animal, which now occupy its surface. The heat indispensable to all terrestrial life is

derived from the Sun; the earth itself does not and cannot supply it.

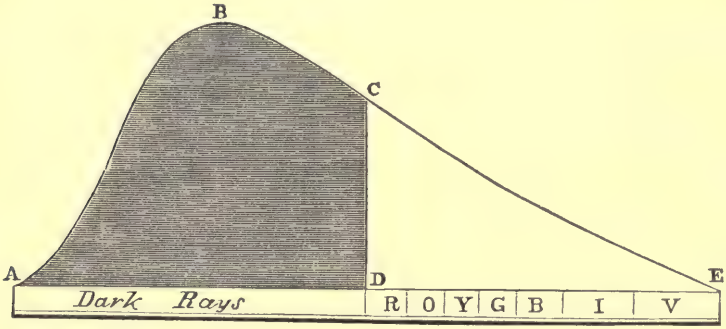
It is the general supposition that our planet, in the early period of its existence, was a molten globe, that in process of time it so far cooled as to form upon its surface a solid crust, and that it has been cooling ever since. This is held to be indicated by the igneous character of the primitive rocks wherever found, and to be confirmed by the spheroidal figure of the earth, being exactly such as would have been taken by a fluid mass revolving with its velocity. Admitting all this to be fact, and that its central nucleus may still be in a more or less molten condition; yet the quantity of heat which reaches its surface from within has long since ceased to be sensible.* So that it may be said, and correctly said, that all the heat enjoyed by the living world comes to it directly from the Sun.

The sunbeam, as all know, is the bearer not of light only, but of *heat* also. It combines in its ethereal threads with the *visible* rays, which illumine, *invisible* rays, which heat. These two kinds of rays are distinct in their nature, and may be even separated. The invisible or heating rays were first discovered by Sir William Herschel, and their discovery was made in connection with the solar spectrum,† and in the following manner: Let the line D E represent the extent of the visible spectrum, from the verge of the Red, on the left, to the opposite verge of the Violet, on the right. Passing a thermometer successively through the seven colors, from right to left, he found the first indication of heat at E; as it advanced through the Violet, Indigo, Blue, Green, Yellow, Orange and Red, the mercury gradually rose, as represented by

* See Tyndall's *Heat a Mode of Motion*, § 663.

† For a description of the *Spectrum*, see Part II., Analogy 2.

the inclined line above, until it reached C, the outward verge of Red, and of all light and color. Advancing the instrument still in the same direction, he observed that the mercury continued to rise, though in perfect darkness, till it reached B, where it attained its maximum height; from thence it rapidly descended to A, where all indication of heat vanished. This experiment proved that side by side with its luminous rays the Sun emits other rays, conveying heat, and that these, though invisible, extend from D to A, and affect the thermom-




DARK AND LUMINOUS RAYS OF THE SUN.

eter as marked by the curved line C B A. Hence the white space, C D E, may be regarded as approximately representing the heating value of the visible, and the black space, C B A D, the heating value of the invisible radiation of the Sun.

In further illustration of the existence and power of these invisible rays, it may be stated that, if those falling between D and A be received on a concave mirror so as to be gathered into a focus, that focus will be found burning hot, so hot that it will readily ignite chips, explode gunpowder, and even heat metal to incandescence. It is not the luminous rays of the Sun, therefore,

but its dark, or invisible rays, that warm the face of nature, evaporate the surface of lakes and oceans, form the clouds, and thus provide the means to water and refresh the earth.

The amount of heat daily received by the earth from the Sun is very great. Some idea of this may be formed from the fact that the quantity of heat which falls upon a little lens, or burning glass, not more than one inch in diameter, is sufficient, as every one has witnessed, to ignite straw, shavings, and similar light materials. Larger lenses or reflectors, of course, exhibit proportionally more powerful effects. The Tschirnhausen burning mirror, constructed in 1687, had a diameter of 70 inches, and a focus 6 feet from the surface; this, though made of copper, readily melted silver, and even vitrified bricks. Bernieres constructed for Louis XV. a burning mirror, made of tinned glass, of still greater power. Buffon contrived a mirror with which he could burn wood at the distance of 200 feet. This last experiment, we may observe, lends credibility to the well-known, but long doubted story concerning Archimedes, at the siege of Syracuse, 213 B. C. "That philosopher," says the historian Zonaras, "having received the Sun's rays on the surface of a mirror, with the help of these rays, gathered together and reflected by the imperviousness and polish of the mirror, inflamed the air, and lit a great flame, which he threw entirely over all the Roman vessels that were anchored within the sphere of his activity, and thus set them on fire." Buffon's experiment, at least, proves the possibility of such an achievement. A burning glass, designed by Lavoisier, easily melted iron, and platinum itself exhibited traces of fusion when exposed to its power.

Now, if such an amount and intensity of solar heat is

found to fall on the few square feet occupied by one of the above mirrors, what must be the amount that falls upon a square mile—upon a whole continent—upon an entire hemisphere! "The earth is a globe," says Sir John Herschel; "and therefore, taken on an average, it is constantly receiving as much, both of light and heat, as a flat circle 8,000 miles in diameter, held perpendicularly to receive it. Now, that circle, or section of the earth, is 50,000,000 square miles, so that there falls at every instant on the whole earth 50,000,000 times as much heat as falls on a square mile of the hottest desert under the equator at noonday with a vertical Sun and with not a cloud in the sky—and in fact nearly *a third more;* for more than a quarter of the Sun's heat is absorbed in the air in the clearest weather, and never reaches the ground. Now, we all know that in those countries it is much hotter than we like to keep our rooms by fires. I have seen the thermometer four inches deep in the sand, in South Africa, rise to 159° Fahrenheit: and I have cooked a beef-steak, and boiled eggs hard, by simple exposure to the Sun in a box covered with a pane of window-glass, and placed in another box so covered. From a series of experiments I made there, I ascertained that the direct heat of the Sun, received on a surface capable of absorbing and retaining it, is competent to melt an inch in thickness of ice in 2h. 13m., and from this I was enabled to calculate how much ice would be melted per hour by the heat actually thrown on a square mile exposed at noon under the equator, and the result is 58,360,000 lbs., or in round numbers, 26,000 tons; and this vast mass has to be multiplied 50 millionfold to give the effect produced on a diametrical section of our globe, that is, on the hemisphere facing the Sun." *

* *Familiar Lectures on Scientific Subjects*, p. 64.

M. Pouillet arrived at almost exactly the same conclusion, but took a different method to express the result. "If the total quantity of heat," says he, "which the earth receives from the Sun in the course of one year, were uniformly spread over all the surface of the globe, and if it were employed, without any loss, in the operation of melting ice, it would be capable of melting a layer of ice enveloping the whole globe and of the thickness of nearly 31 metres (101 feet); or, in other words, to heat an ocean of fresh water 60 miles deep from the temperature of melting ice to the boiling point."

Professor Tyndall has employed another method still to calculate and to express the enormous amount of solar heat incessantly poured upon the globe of the earth: "The aqueous vapor of the air, with all the rain and snow into which it is formed, is the direct product of the Sun's heat. The latent heat of aqueous vapor, at the temperature of its production in the tropics, is about 1,000° Fahr., for the latent heat augments as the temperature of evaporation descends. A pound of water, then, vaporized at the equator, has absorbed 1,000 times the quantity of heat which would raise a pound of the liquid one degree in temperature. But the quantity of heat which would raise a pound of water one degree, would raise a pound of cast-iron ten degrees: hence, simply to convert a pound of the water of the equatorial ocean into vapor, would require a quantity of heat, sufficient to impart to a pound of cast-iron 10,000 degrees of temperature. But the fusing-point of cast-iron is 2,000° Fahr.; therefore, for every pound of vapor produced, a quantity of heat has been expended by the Sun, sufficient to raise 5lbs. of cast-iron to its melting point."* Let

* *Heat a Mode of Motion*, § 240.

the reader pause, and reflect what this astonishing fact implies.

Let him first consider that all the water which all the rivers of the globe pour into the ocean has been raised therefrom in the form of vapor—all that the Hudson and St. Lawrence, the Colorado and Rio Grande, the Mackenzie and the Mississippi, in North America; all that the Orinoco, the Amazon, and the La Plata, in South America; all that the Nile and the Niger, the Congo and Zambesi, in Africa; all that the Rhine, the Rhone, the Danube and the Volga, in Europe; all that the Ganges and Indus, the Obi and Yenesi, the Amoor and Hoang-ho, the Yang-tse-kiang and Brahmapootra, in Asia; together with a thousand other minor streams in each of these continents:—let him estimate the number of pounds of water which all these daily and hourly pour into the oceans of the globe, and then consider what must be the amount of heat that would melt five times that weight of solid cast-iron into flowing liquid, and he will have some idea of the immense amount of heat which the Sun perpetually pours upon the globe we inhabit. And yet all this constitutes but a part, and the smaller part, of that heat, for a vast quantity, doubtless more than half, of the vapor raised falls back into the ocean in the form of rain and snow, without ever reaching the dry land or contributing one drop to form the rivers.

To aid him to a more adequate appreciation of the great fact before us, let the reader again contemplate the vast fields of ice and mountains of snow embraced within the arctic and antarctic circles, embracing an area of some 15,000,000 of square miles; let him further survey the masses of the glaciers and perpetual snows resting on the heights of all the mountain ranges of the globe—the Alps, the Urals, the Himalayas, the Altai, the Andes

and the Rocky Mountains; and let him add all these together, and increase the sum fivefold; and then conceive an extent, a length and breadth and depth of cast-iron, equal in weight to the whole, raised to the white heat of fusion, and he will have before him an expression of the amount of heat expended by the Sun in their production.

The above facts and illustrations, partial and approximate as they are, may serve to convey some idea of the enormous amount of heat poured without intermission from the great Sun, upon the earth, and of its perpetual dependence upon him. From the Sun, as before stated, our globe derives all its heat and vitality. It is his warm beams that maintain the atmosphere, the soil, and the waters of the ocean at such a temperature as renders it habitable to man, or beast, or even capable of producing and supporting the lowest species of vegetation. Deprived of the solar heat, the earth would speedily become a frozen, dead and tenantless ball. The Sun is the life of the world.

### Teachings.

Here again we find the Solar orb a most significant and instructive type of the Sun of Righteousness; for, as the former is the source from whence the whole system of nature derives its vivifying heat, *so the latter is the Fountain from whence the whole system of revealed religion derives its spiritual vitality.* Christ is the radiant vital power that animates the whole sphere of Scripture Truth. Apart from him all would be cold and lifeless. Divested of the mercy, and grace, and love, which flow through all its parts from Christ, as the Son of God and Saviour of men, the Sacred Volume would be a book without comfort, without hope, without value, or significance. Its whole atmosphere would be chilled, all its

springs of consolation would be frozen up, and its soil everywhere would be found barren and desolate. Not more cheerless would the earth be without the Sun, than the whole circle of revelation would be without Christ. He is its life.

Christ is the life of all its *Doctrines.* Apart from Him these would be but meaningless sounds, or empty forms of words. What is the doctrine of Atonement apart from his sacrifice upon the cross? What is the doctrine of Justification by faith apart from his merits? What is the doctrine of Regeneration apart from the renewing of his Spirit? What is the doctrine of our Resurrection disconnected from his, who is the first fruits of them that sleep? for if Christ be not raised our faith is vain, and we are yet in our sins.

Christ is also the life of all the *Ordinances* of religion. Dissevered from him these would be as wells without water, or clouds without rain. What is Baptism, what its benefit or significance, apart from the cleansing efficacy of his blood, the fountain opened for sin and uncleanness? What is the Holy Supper apart from the memory of his dying love? What is Preaching if it proclaim not him whom God hath exalted to be a prince and a Saviour to give repentance and remission of sins?

Christ is, likewise, the life of all Christian *Graces.* What is Faith, or Hope, or Love, without him as their ground and inspiration?

Christ, moreover, is the life of all religious *Duties.* He it is that worketh in us both to will and to do of his good pleasure. "As the branch cannot bear fruit of itself, except it abide in the vine; no more can ye, except ye abide in me."

And, lastly, Christ is the life of all religious *Happiness.* He is our peace. A sense of his living presence, assur-

ance of his love shed abroad in the heart, daily and hourly communion with him; oh, this is the fountain of the highest felicity attainable to mortal man on earth!

Christ is the light and the life of the whole Christian system. "Intellectually, morally, and spiritually, Christ is Christianity. Christianity is not related to him, as a philosophy might be to a philosopher, that is, as a moral or intellectual system thrown off from the mind of its author, and resting thenceforward only on its own merits. A philosophy may thus be severed altogether from the person of its originator with entire impunity. Platonic thought would not have been damaged if Plato had been annihilated. But detach Christianity from Christ, and it vanishes before your eyes into intellectual vapor. For it is the essence of Christianity that, day by day, and hour by hour, the Christian should live in conscious, felt, sustained relationship to the everliving author of his creed and his life. Christianity is non-existent apart from Christ; it centres in, and radiates from, him. It is not a mere doctrine bequeathed by him to a world with which he has ceased to have any dealings. It perishes outright when we separate it from the living person of its founder. Christ is the quickening spirit of Christian humanity. He lives in Christians; thinks in Christians; acts through and with Christians; and is associated with every movement of the Christian's deepest life. That life is a loyal homage of the intellect, of the heart, and of the will to a Divine King, with whom will, heart, and intellect are in close and constant communion, and from whom there flows forth through the truth, and the sacraments, and the Spirit, that supply of light, and love, and resolve, that enriches and ennobles the Christian soul."*

* Liddon's *Bampton Lectures.*

## ANALOGY II.

*As the origination and permanence of the Sun's heat, for the benefit of the planetary system, are inexplicable to human science—so the incentive and perpetuity of the love of Christ, the Sun of Righteousness, for the race of man, are past all human understanding.*

### Phenomena.

In the preceding Analogy we have seen what an enormous quantity of heat unceasingly falls upon the earth from the Sun, and how stupendous the work it is incessantly accomplishing on sea and land. And yet what *our* world receives is but a minute fraction of the total amount of heat which that great and glowing orb throws out on all sides and in all directions. Sir John Herschel employs the following striking method to set forth that total amount. The globe of the earth occupies only the 75,000th part of the circumference of the circle which it describes about the sun. So that 75,000 of such earths at that distance, and in that circle, placed side by side, would all be equally well warmed and lighted,—and, then, that is only in one plane! But there is the whole sphere of space above and below, unoccupied; at any single point of which, if an earth were placed at the same distance, it would receive the same amount of light and heat. Take all the planets together, great and small; the light and heat they receive is only 1-227 millionth part of the whole quantity thrown out by the Sun. All the rest escapes into free space, and is lost among the Stars; or does there some other work that we know nothing about. Of the small fraction thus utilized in our system, the earth takes for its share only one-tenth part, or less than 1-2000 millionth part of the whole."*

* *Familiar Lectures*, p. 63.

Professor Tyndall expresses substantially the same fact in the following manner. "Knowing the annual receipt of heat by the earth, we can calculate the entire quantity of heat emitted by the Sun in a year. Conceive a hollow sphere to surround the Sun, its centre being the Sun's centre, and its surface at the distance of the earth from the Sun. The section of the earth, cut by this surface, is to the whole area of the sphere, as 1 : 2,300,000,000; hence, the quantity of solar heat intercepted by the earth is only 1-2,300,000,000th of the total radiation."*

But what we are specially concerned with in the present Analogy is the *intrinsic heat* of the Sun, or the actual heat it embodies in itself. This, says one philosopher, is "seven times as great as that of the vivid ignition of the fuel in the strongest blast furnace;" while another, after a series of careful experiments, estimates it at nearly thirteen millions of degrees of Fahrenheit; and a third, as being one thousand times that of oxy-hydrogen flame, one of the hottest known.

M. Pouillet, a distinguished French astronomer, makes the following statement: "If the total quantity of heat emitted from the Sun were exclusively employed to melt a layer of ice closely surrounding the solar globe, that quantity of heat would be sufficient to melt in *one minute* a layer 11.8 metres (36.6 feet) thick, and in *one day* a layer 17 kilometres (10.5 miles) thick." And he adds that, this calculation rests upon no mere hypothesis, but is based upon the best-established principles regarding the radiation of heat.

Sir John Herschel has made the following ingenious comparison and computation, which show in a very striking manner the prodigious intensity of the solar heat. "Let us suppose a cylindrical pillar of ice, forty-

* *Heat a Mode of Motion*, § 685.

five miles in diameter, to be continually darted into the Sun, and that the water produced by its fusion is continually carried off. In order that the heat given off constantly by radiation should be wholly expended in its liquefaction, it would be necessary to plunge the cylinder of ice into the Sun with *the velocity of light.*" * In other words, the heat of the Sun is sufficient, without diminishing its intensity, to melt in a *second of time* a column of ice 1,590 square miles at its base, 182,000 miles in height.

The figures and comparisons employed by Professor Tyndall to set forth the stupendous intensity of heat at the solar focus are these:—"The heat emitted by the Sun, if used to melt a stratum of ice applied to the Sun's surface, would liquefy the ice at the rate of 2,400 feet an hour. It would boil, per hour, 700,000 millions of cubic miles of ice cold water. Expressed in another form, the heat given out by the Sun, per hour, is equal to that which would be generated by the combustion of a layer of solid coal, ten feet thick, entirely surrounding the Sun; hence, the heat emitted in a year is equal to that which would be produced by the combustion of a layer of coal seventeen miles in thickness." †

Such is the intrinsic heat of the Sun, and such the prodigious quantity of heat it throws out without intermission. As we contemplate these stupendous facts and figures, two questions naturally suggest themselves to the mind: How originated this great heat of the Sun? and, how has it been sustained and perpetuated through all the ages of the past? To neither of these questions is human science able to return any very definite or certain answer.

As to the first question, those who hold to what is

* *Outlines of Astronomy*, § 397. † *Heat a Mode of Motion*, § 686.

known as the Nebular Theory, have attempted to account for the origination of the Sun's heat in some such manner as this:—In its earliest condition, the solar globe existed in the form of an extended mass of nebulous matter, or a vast cloud of gases. By the force of gravitation this was slowly and silently drawn together, and the compression of the particles, together with the chemical action which presently set in, gradually produced a degree of heat through the mass. As this compressive and chemical process went on, acting more and more powerfully, the whole became a rounded and incandescent cloud; and this bright and heated cloud, in process of time, through the same potent agencies, was condensed into a sphere of glowing fluid; and this again, finally, into the radiant and luminous orb we now behold shining in the heavens. This, it must be admitted, is a grand and sublime conception; but it must be remembered that it is but a *theory*, and that its account of the origination of the Sun's heat is nothing more than a hypothesis.

But in whatever form the Sun may have originated, and in whatever way its heat has been garnered or produced, certain it is that it has existed as we now behold it, sending forth ceaseless floods of light and heat into surrounding space, during a period, compared with which, that embracing the whole of human history is but as one day to a thousand years, or perhaps, to a thousand ages. The proof of this we have already given.* And here comes in our second question, How has the Sun's heat been kept up and perpetuated through these thousands and millions of years? That the Sun is dissipating its energies in the constant flow of light and heat which it emits there can be no doubt. This is demon-

* See Part I., Analogy 3.

strable. The working of a steam-engine, says Proctor, does not more certainly indicate and prove the consumption of fuel than does the Sun's radiation of light and heat imply and prove the consumption of its energy. How then is this expenditure repaid? By what means, or in what way have its radiant forces been sustained undiminished, unweakened, through all the vast periods of its existence? By what arrangements have its energies been fed and replenished so that its eye remains undimmed and its natural heat unabated to this day?

Various hypotheses have been put forth with a view to answer these questions, among which the following are the most noteworthy:

Some have supposed that the present light and heat of the Sun proceed from *what remains of the high temperature originally imparted to its stupendous globe;* and that both must be diminishing in intensity, though so slowly as to be imperceptible within any such short periods as the life of a man, or the age of a nation. To this idea we may say, that the Nebular Theory derives the earth and all the other planets from one and the same original gaseous mass as the Sun itself, and therefore holds that the materials constituting the solar orb are the same in nature as those which compose the terrestrial globe. And the revelations of the spectrum confirm this view.* All that we know of cosmical phenomena, says Tyndall, declare our brotherhood with the Sun, and affirm that the same constituents enter into the composition of its mass as those already known to us on the earth. But this "cooling hypothesis" renders it necessary to ascribe to it qualities wholly different from those possessed by terrestrial matter. Assuming that the Sun possesses specific heat equal to the highest that belongs to any earthly

* See Part II., Analogy 7.

substance, then, at its present rate of emission, its entire mass would cool down 15,000° Fahr. in 5,000 years. Now if such a rate of cooling had prevailed, we know that the Sun has existed long enough to have sunk it into such a state of decrepitude as would have numerous ages since rendered it incapable of either warming or lighting the planetary system. Within historic times, no diminution in its light or heat has been detected.

Again, assuming that the Sun is a globe of fire, some have concluded that the light and heat we receive from it must proceed from *the combustion of its substance.* This is a very ancient and has been a very prevalent idea, but one, nevertheless, which recent scientific light compels us to abandon. According to this hypothesis, the Sun is a fire, differing from our terrestrial fires only in the magnitude and intensity of its combustion. But what is the burning matter which can thus sustain itself through immeasurable periods of time? It can be proved, and has been proved, that no material found on the earth, and no meteoric substance that has fallen from the heavens, would be competent for this. "The chemical energy of such substances," says Tyndall, "would be too weak, and their dissipation too speedy. Were the Sun a block of burning coal, and were it supplied with oxygen sufficient for the observed emission of light and heat, it would be utterly consumed in 5,000 years." It is not by burning, then, that the Sun continues to give out heat.

A third theory is, that the Sun's heat is produced and perpetuated by *the contraction of its volume.* The process of condensation and contraction which (according to the nebular theory) reduced it from an extended and diffused gaseous mass to a more compact and incandescent cloud, and from this again to a molten globe, is supposed to be

still going on; its constituent particles grinding harder and harder upon one another, and thus producing and perpetuating its heat. Helmholtz, an eminent German physicist and mathematician, has made the calculation, that if the volume of the Sun should be contracted by the 1-10,000th part of its diameter, there would be produced thereby an amount of heat equal to that given out, at the present rate, in a period of 2,000 years. And he has further calculated, that if this contraction should proceed till the mean density of the Sun's substance should become equal to the mean density of the earth's substance, the process would evolve an amount of heat sufficient to supply the earth and the system for 17,000,000 of years.* But this hypothesis, plausible as it appears, like the preceding, has its difficulties and its defects, and is open to many serious objections.

A fourth theory attempts to account for the sustained heat of the Sun by *external friction.* This is briefly stated and disposed of by Professor Tyndall, as follows:—"The Sun we know rotates upon his axis once in about twenty-five days; and the notion has been entertained that the friction of the periphery of this wheel against something in surrounding space produces the light and heat. But what forms the brake, and by what agency is it held, while it rubs against the Sun? Granting, moreover, the existence of the brake, we calculate the total amount of heat which the Sun could generate by such friction. We know his mass, we know his time of rotation, we know the mechanical equivalent of heat; and, from these data, we can deduce, with certainty, that the

* Astronomers have determined that the present density of the Sun is but one-fourth that of the earth; that is, a cubic mile of the Sun's substance weighs but one-fourth of what a cubic mile of the earth's substance does. In size the Sun exceeds the earth 1,384,472 times, but in mass or weight only 354,936 times.

force of rotation, if entirely converted into heat, would not supply a sufficiency even for two centuries. There is nothing hypothetical in this calculation."

A fifth theory, first propounded by Dr. Mayer of Germany, and worked out by Prof. W. Thomson of England, holds that the heat of the Sun is produced and sustained by *the incessant fall of meteors upon its surface.* It is now regarded as an established fact that there are uncounted millions of diminutive cosmical bodies, or comparatively small stony and metallic masses moving with great velocity through space, after the manner of the planets. These in groups or streams, move more or less uniformly distributed, encircle the Sun in elliptical orbits, which are slowly but certainly nearing it. These meteoric bodies are, indeed, invisible even through the telescope; yet we have palpable evidence of their existence. The earth in her annual circuit happens to cross the path of one of these streams, and the result is that great numbers of them strike upon her surface in the form of what some have called "thunderbolts," but which are commonly termed "shooting stars." The most remarkable of these meteoric falls occur on the night of the 12th of August and that of the 14th of November. On one of these occasions, they were seen, at Boston, to fall almost as thick as snow-flakes; it was estimated that no less than 240,000 fell within view in the space of nine hours. That vast bright zone, called the Zodiacal Light, which encircles the Sun, is supposed to be composed of innumerable millions of such meteors. And as more or less of these, in their onward career, come under the overpowering attraction of the Sun, they are drawn inward and fall upon it. And in this way a constant rain of meteoric matter is poured down upon his surface, each falling mass creating a degree of heat by its concus-

sion proportioned to its weight and velocity. This will be readily understood by reference to a familiar fact: the blacksmith, by a vigorous blow of his hammer upon a bar of cold iron, will raise its temperature; and by a repetition of such blows he can in a few moments bring it to a red heat. Similar, but infinitely more intense, must be the effect of the repeated blows of these meteors falling from vast distances and with inconceivable speed upon the globe of the Sun. This is a matter susceptible of mathematical calculation. A meteoric mass or asteroid falling from the distance of the outer verge of the solar system would strike the Sun with a velocity of 390 miles per second, and its blow would develop more than 9,000 times the heat generated by the combustion of an equal asteroid of solid coal. And a meteoric mass, falling from the average distance of the Zodiacal Light, would strike the Sun with a velocity of 276 miles per second, and its shock would create an amount of heat equal to that of the combustion of upward of 4,000 such masses of coal. If the planet Mercury were to be suddenly stopped in its orbit, and to fall directly into the Sun, the blow would produce a quantity of heat equal to the total amount emitted by the Sun in seven years. If the earth were to fall in a similar manner, its shock would generate a quantity of heat equal to the total emission of the Sun in 95 years; and the fall of Jupiter, equal to that of 32,240 years.—From calculations such as these, the advocates of this theory hold, whether it be the actual fact or not, that in the fall of meteors they have an agency competent to restore his lost or expended energy to the Sun, and to maintain a temperature at his surface which transcends all terrestrial combustion. "In the fall of meteors," says Professor Tyndall, "whatever may be the ultimate fate of the theory, we find means that are *capable* of producing the solar light and heat."

A METEORIC SHOWER.

Admitting the competency of the meteoric agency to produce the required results, yet this theory leads to what seem to be insuperable difficulties to its acceptance. Besides the utter *discordance* of such terrific pounding and uproar with the silent and beautiful harmony which prevails in all else throughout the system, it obviously tends to the derangement, if not to the speedy destruction, of the whole celestial machinery. Professor Thomson has calculated that the quantity of matter which should fall every year upon the Sun so as to maintain its temperature, would form on its surface a bed 66 feet in thickness. The bulk of the Sun would therefore gradually increase; and it would result from this, that, in 53 years, the length of time occupied in its rotation on its axis would be increased by one hour; and that in 4,000 years its diameter would be augmented by 50 miles. This again would affect the length of the year upon our own globe, and a similar result would be produced in all the other planets.

One more theory remains to be mentioned. This ascribes the perpetual light and heat of the Sun to *Electric excitation.* It assumes that the universally diffused ether, which occupies all space, is an "electric ether." This medium, being infinitely elastic, is easily disturbed and put in motion, and instantaneously transmits any impulse given to it. The most convenient and regular mode, at the command of man, for disturbing and putting in motion this electric medium is by axial and orbital revolutions opposite to each other, such as the daily and annual revolutions of the planets opposite the Sun. The most effective machine for this end is that of Holtz, which mainly consist of one glass plate revolving opposite to another, without contact, and with a space intervening between them, as between the earth and Sun. By

means of this, bright electric flashes are seen to pass nearly two feet through the air in a zigzag course. The rotation of all bodies opposite to magnets induces circulating electric currents. The same is supposed to hold true in connection with the grand movements of the solar system. The swift axial rotations of the planets opposite the excited globe of the Sun, by inducing the continual circulation of electric currents about each one of them, convert them all into powerful electro-magnets. Thus we have a solar system with a vast central electro-magnet, and one hundred and fifty electro-magnets revolving around it, each rotating on its axis. These act and react on each other unceasingly, and with intense power, developing the phenomena of *solar light and heat.*

"If the mere movement of one disc near another," says a zealous advocate of this theory, "so develops light as to obtain for a simple instrument the name of 'Electrophorus,' or *Sunshine-producer;* and if the rotation of one cylinder opposite to another excites a dazzling light, —we may consider that the swift revolutions of more than one hundred and fifty great globes about the Sun, seven hundred fold greater than them all, are similarly employed for the conversion of their mechanical force into the light and heat of sunshine. In the operation of an inductive electric machine, the disc which is at rest is independently excited by friction, so that it will react when the other disc is turned opposite to it. In the operation of the solar system, instead of an artificial excitation, as of the disc at rest, the great central orb is excited by a swift rotation on its axis, opposite to the several planets, each similarly excited by rotation on its axis.

"This axial rotation induces electric currents around

the Sun, and around each of the planets; which thus become polarized.

"With the extraordinary magnitude of the central orb, combined with its extreme velocity of rotation, a correspondingly greater intensity of electric excitation of the solar electro-sphere is to be anticipated. These anticipations are confirmed by the observations of astronomers during total eclipses of the Sun, while the dark disc of the Moon screens its dazzling brightness, and leaves visible only the extreme ring of light, denoted a *corona*. Observers have described this corona as exhibiting coruscations, wildly darting off far beyond the extreme edge of the solar disc, flashing thousands of miles in tongues of flame. Between the luminous flashings over the surface of the Sun, at times, are openings that disclose the dark portions of the globe beneath; which constitute spots on the Sun. These openings are constantly varying with a rapidity that only the quick movements of the electric ether will explain. There are instances in which solar spots of 50,000 miles diameter are formed in a single day; and others where they disappear as suddenly. The brightest parts are not stationary, but fluctuate like electric flashes. It is also found that the appearance of solar spots is attended with extraordinary perturbations of compass needles all over the earth. This fact shows the direct relationship and electro-magnetic connection between the solar excitation and the electric currents continually circulating about the earth, which control the movements of all compass needles. . . . . .

"The great central orb of the solar system serves as a centre of forces, against which impinge the vibratory impulses of the universal electric ether, excited by the orbital revolutions of the planets. From this central

point of reaction the vibrations of the electric ether, continually beating against it, are reflected back in sunshine like surges from a rock in mid-ocean, leaving its surface covered with sparkling foam.

"If a few small magnets revolved around the axis of a magneto-electric machine suffice to illumine more than a thousand square miles of dark headlands and waters,—reasoning from terrestrial to celestial mechanics, how indescribable must be the magnificence of that Lighthouse in the heavens, whose beams are the result of the combined movements of more than one hundred and fifty vast magnetic planets revolving around the central orb of the solar system!

"As long as these mighty planets continue to revolve, so long will the Sun continue to shine. The question of the *source* of solar light and heat is, therefore, resolved simply into that of the source of mutual motive-power; namely, the axial rotation and orbital revolution of the heavenly bodies." * Such is the theory of electric excitation, which, like all the preceding, has its weak points and unsolved difficulties.

From the number and diversity of the theories now reviewed the reader must see how difficult and formidable the problem of the origin and sustentation of the Sun's light and heat is, and how it has thus far baffled all the science of man to solve it with any degree of certainty. Nor is this to be wondered at when we consider the vast distance at which that orb is situated from us, and the widely different conditions under which its elements and forces affect one another, from anything with which we are familiar. All the experiments and calculations that have been made with a view to determine these facts, have been based on the supposition that physical

* See Dr. Zachariah Allen's *Solar Light and Heat*, pp. 12–54.

causes and effects observe the same order and relation in the solar orb as they do upon our own globe. But it is certain that, in many respects, at least, they do not. The force of its gravitation, the intensity of its heat, the pressure of its atmosphere, and the velocity of its elements, infinitely transcend anything known in our world; and these may affect the very constitution of material substances, as well as their mutual relations, in a manner and to a degree of which the terrestrial globe affords no example. And that they do so, the revelations of the spectroscope plainly indicate. That instrument offers conclusive proof that metals and minerals which the scientist can volatilize only in small quantities and by special contrivances, are, in immeasurable quantities, reduced by the intensity of the Sun's heat into vast clouds of glowing vapors over its surface. So, on the other hand, the immense pressure which prevails near the solar surface may be adequate, though we have no direct proof of the fact, to convert gases into liquids, and liquids into solids. And again, what can we know of the influence of its overwhelming velocities?—we see the bullet melting as it reaches the target, and the meteor ignited and vaporized as it passes through the air; who, then, can estimate the effects of the inconceivably swifter motions that take place among the elements of the Sun—of the uprushing of flames or luminous clouds in a few seconds to the height of fifty thousand, and even a hundred thousand miles—of cyclones sweeping over seas of molten minerals and liquefied gases, or through an atmosphere of metallic vapors, at a speed of seven thousand miles per minute! The fact is, the more the constitution of the Sun has been studied, and the more that has been learned respecting the physical laws by which its phenomena are to be interpreted, the more numerous and

insuperable are the difficulties which appear to surround it.

This is the conclusion of the most able and sober minds. "The facts connected with the solar light and heat," says Professor Tyndall, "are so extraordinary, that the soberest hypothesis regarding them must appear wild:" Proctor also speaks to the same effect; "I confess that I am very far from sharing that confidence which I find some men possess in dealing with problems of solar physics. I can only look on with a sense of bewildered admiration while the professors of rival theories exhibit the physical habitudes of the Sun as obviously explicable according to contradictory hypotheses. It seems to me that only a very energetical forgetfulness of a large portion of the evidence can account for the adoption of any of these theories." And our American astronomer, Professor Young, with the characteristic modesty of a great mind, says, "What sustains the tremendous solar heat, I cannot answer."

Thus the Sun, while it is a "great light," is, also, a great *mystery*. And in these baffled efforts of the most vigorous human intellects to interpret its unwasted energies we have a striking comment on the words of holy writ,—"He doeth great things past finding out; yea, and wonders without number."

## Teachings.

In the origin, vastness, and perpetuity of the Sun's heat, bathing the world, and the whole system of worlds, with the elements of life, energy, and happiness, we have the most apt and expressive type within the reach of human observation, of the life-giving beams of the Sun of Righteousness, namely, his all-embracing and ever-enduring love to man.

The evidences of the universal presence of the Sun's heat, and of its universal beneficent agency in air and sea and land, are not more certain, or obvious, or wonderful, than those of the love of Christ toward our fallen race; nay, the latter are incomparably greater in all these respects. Whether we contemplate the original incentive, or the unchanging nature, or the unceasing exercise of that love, we are equally astonished and equally unable to comprehend or account for it. "It passeth all understanding."

The love of Christ knows neither beginning nor end. From the depths and solitudes of eternity past, when no creative fiat had gone forth, no ray of light had pierced the darkness, no orb of matter had accomplished a revolution in the voids of space—"while as yet he had not made the earth, nor the fields, nor the highest part of the dust of the world"—by anticipation "he rejoiced in the habitable parts of the earth, and his delight was with the sons of men." With gladness he looked forward to the period when Eden should bloom, and the creature Man, radiant in his own image, should take possession of its delights, and offer his earliest acts of devotion at his feet. Yea, as he foresaw the fall of that highly-favored being, and the consequent degeneracy of all his race, he resolved to remedy the evil, and to take advantage of it in a way which should accrue to the infinite good of the very creatures who introduced the evil, and redound to the glory of his own grace and love. From the height of his sanctuary, he prospectively beheld Sinai, from whence his law should be proclaimed; and Zion, which should be crowned with his temple; and Calvary, which should sustain the mystery of his cross; and with all that the justice of that law would demand for its transgression, all that the sacrifices of that temple would sym-

bolize, and all the ignominy and suffering which that cross held forth, clearly before his view, he was still of one mind and changed not. Yea, he looked still beyond, and saw the glorious issue of all—saw a world of dependent, lost and ruined beings reclaimed, saved and sanctified through his sacrifice; every sin forgiven, every evil remedied, and every want supplied; every heart a channel through which a fullness of delight should constantly stream, and every soul forever enlarging to receive more and more from the inexhaustible ocean of his felicity. And with this glorious consummation set before him, for the joy of its accomplishment, he exclaimed, "Lo, I come; I delight to do thy will, O my God!"

And when ages which no man can number had rolled away, and the time appointed in the councils of the Triune God was come, still moved by the same eternal love—oh, amazing thought!—to accomplish our redemption, he leaves the enjoyments of heaven, forsakes the bosom of the Father, quits the region of everlasting day, and descends to this lower world, and in a way surpassing all thought and investigation unites himself to human nature —so unites himself as to become literally man, and to dwell among sinful men on earth. O wondrous humiliation! For him whose dwelling-place from all eternity had been the highest and holiest heaven of glory—for him who was the Father's well-beloved, the brightness of his glory and the express image of his person, who received the praises and homage and ministrations of angels —for him to come down to this nether world, peopled by a race sunk in ignorance and depravity, deformed by vices and crimes, and immersed in guilt and wretchedness—oh, stoop of ineffable love! If a prince, an emperor had forsaken his palace for a hovel to rescue a slave; nay, if Gabriel from benevolence to worms had forsaken his

throne, and taken upon him their crawling form to save them from perishing, it would have been an event unworthy to be mentioned beside the humiliation of the Son of God for the redemption of sinners.

Nor ends the wonder here;—having come to earth, again he chooses the humblest condition among the humble dwellers of his footstool. He appropriates none of the wealth, assumes none of the titles or grandeur of the princes of this world; but takes upon him the form of a servant, and makes himself of no reputation. His life from its beginning to its close is a life of poverty and toil. Dispensing benefits and blessings to others which know no price and can be purchased by no wealth, himself owns neither a house nor a tent wherein to dwell. "The foxes have holes and the birds of the air have nests, but the Son of man hath not where to lay his head." Destitution and tears often mark his weary steps as he goes about doing good. His divine instructions and beneficent miracles all bring him but ill returns. As he journeys from Galilee to Judea, as he dwells at Capernaum, or tarries at Jerusalem, scarce a solitary voice calls him blessed, scarce a solitary hand is stretched out in friendship, scarce a solitary roof proffers him a shelter. Yet, nor toil, nor poverty, nor cold neglect changes or abates the love that glows within his heart for the erring and sinful creatures he came down to redeem.

Still proceeding in his career of self-sacrificing love, withal "He becomes a man of sorrows, and acquainted with grief." He is despised and rejected of men. His actions are decried, his motives are misrepresented, and his character is maligned. Because he is holy and denounces all evil, the workers of evil conspire against him. He is falsely accused, he is proscribed and persecuted. To accomplish his destruction, the very forms of justice

are violated, and the very name of religion prostituted, by the unrestrained malice and revenge of his enemies. Ingratitude, injustice and hate pierce his sacred heart. Many gracious words, and many good works has he shown to them from his Father; but he is arraigned as a malefactor, and condemned as a criminal, while his very judge is forced by reason and conscience to cry aloud, "I find no fault in him." He is derided with a purple robe and a mock sceptre. He is scourged and spitten upon. He is made to take the vacated place of a murderer. He is ruthlessly nailed hand and foot to a cross. And even there he is taunted and reviled, as his sacred blood, drop by drop, stains the accursed tree upon which he hangs. He lingers there, and thirsts—he cries aloud—he dies—and oh, what a death! But in all, and through all this, he is unchanged, unmoved in the deep love of his heart, and in all his gracious purposes for man and man's salvation. His last and expiring breath he expends in prayer for his enemies and murderers,—"Father, forgive them, for they know not what they do." O Son of the Living God, was there ever love like thine!

If in the perpetual and abounding flow of light and heat from the Sun of nature we find a mystery which baffles all the science of man—in the full, irrepressible, and eternal flow of love from the Sun of Righteousness we see a mystery a thousandfold greater, and a thousand times transcending the imagination of men and of angels. In the scene of Calvary everything fills us with amazement. Everything here is superhuman. We behold in the Sufferer, hanging upon that cross, a Being spotless in life, pure in spirit, gentle in speech, compassionate in heart, most benevolent toward man, most devout toward God, most beloved of heaven; and yet the victim of the grossest injustice, and of the most relentless and diabolical

cruelty. O horrid and atrocious crime! Why roused not the very elements of nature to avenge him of his adversaries? Why flashed not some stream of lightning from the clouds to consume those crucifiers of the adorable Son of God? Why went there not forth some destroying angel in that unnatural night, as through the hosts of Sennacherib, to smite those murderers? Or why descended not a legion of angels to loosen him from the accursed tree, and bear him in their arms back to the bosom of the Father? Why? Why? Because the Sufferer's own love held them all back. "I came not to destroy men's lives, but to save. I am the Good Shepherd; I lay down my life for the sheep. For this end came I into the world." O yes, it was not the iron spikes, nor the Roman spears, but his own love that fastened and detained him to the end upon that cross. It was the most free, sovereign, boundless benevolence of his own heart that led the Lord of life and glory thus to die for men.

But what awakened such unquenchable love in his bosom? What sustained and fostered that love through all his unparalleled trials and provocations, through all his mortal and untold sufferings, even unto death? If every theory advanced by the science of man to account for the unwasted and unwasting energies of the Sun of nature has failed, much more will every theory conceivable to created minds, human or angelic, fail to assign a reason external of his own ineffable nature, for the undying love of the Son of God. To what that is conceivable can we ascribe it? The fallen and depraved creatures whom he came to redeem did not *deserve* that he should have thus become the subject of toil and penury, sorrow and shame, sufferings and death, in order to save them. They had no claims that they could urge, no

rights or merits that they could plead. They were sinners, they were enemies, they were righteously condemned. Their desert was his judicial displeasure, and everlasting banishment from the presence of his glory. Nor did he thus undertake on their behalf for any *reward* that they could make in return; for they had nothing to give or to offer but what was already his own. To him, by creation, belonged all the fruits of the field, all the treasures of the mountains, and all the pearls of the deep—yea, the earth and the fulness thereof. Nor was he moved to do this great thing by *the urgency of their entreaties;* no, they did not request, they did not desire him to do it. Fallen and benighted, they were too ignorant to know their own happiness, and too depraved to appreciate what was done for them. Nor did he interpose for their rescue because he needed their *service* or their *worship;* for, without sorrow or suffering, and by one word, one volition, he could have created ten thousand worlds, all teeming with holy and happy beings, ever ready to obey the slightest intimation of his will. Nor, finally, did he purchase their redemption at so inestimable a price, because their preservation was *indispensable to his happiness,* or *essential to his glory;* oh, no; for had they all, and with them the earth upon which they dwelt, sunk into everlasting nothingness and oblivion, it would not have taken one ray from the effulgence of his glory, nor one drop from the ocean of his felicity. To what then shall we trace or ascribe the unparalleled love of Christ in the redemption of our race? To nothing, to nothing, but what he is in himself—to nothing but the boundless benignity, mercy, and generosity of his Divine Nature, welling up from the infinite depths of his Being, and gushing forth in resistless energy, as displayed in the benevolence of his ministry, in the struggles of

his bloody sweat, and in all the patient endurance of the insults and agony of his cross. All that he said, or did, or suffered, was but a manifestation of what he was in himself—of the rectitude, purity, and truth, and above all, of the *love* that ruled and reigned eternal in his breast. GOD IS LOVE. This is the essence of his character.

## ANALOGY III.

*As the Sun's warm beams are the origin of all energy and motion in the material world—so the Sun of Righteousness is the origin of all spiritual life and activity in the moral world.*

### PHENOMENA.

THE Centennial Exhibition, at Philadelphia, in 1876, was an event of profound interest to every American, not only for its intrinsic importance, but also by reason of its historic associations. Its interest and importance, however, were not confined to our own nation, but extended to the whole civilized world. It was a concentration of the most valuable productions both of the practical science and mechanic skill of all the foremost nations of the globe. It was a world's display for the world's benefit. When the visitor, from whatever quarter of the globe he might have come, entered the building called "Machinery Hall," for example, *there* lay before him such a number and variety of tools and instruments, machines and engines, for all the purposes of civilized life, as probably had never before been brought together into one place. And all these he could see in actual operation from day to day. And whether he looked to the north or to the south, to the east or to the west, along those broad and

extended avenues, or along the narrower aisles, nearly every object upon which his eye rested seemed to be in activity as a thing of life. And more marvellous operations, or a greater diversity of movements, the imagination itself could hardly picture. There were wheels, and shafts, and cylinders, revolving in every possible direction and at every degree of speed; pistons advancing and retreating; springs bending and unbending; spindles whirring and drawing out their cotton and silken threads; shuttles darting and weaving divers fabrics; sewing machines stitching; hammers striking; drills boring; lathes turning; lettered types leaping into place, and spelling words, and forming sentences; presses with iron fingers drawing in sheets of paper, printing them, and then orderly laying them away; the air fanned into gentle breezes among the crowd, or rushing impetuously through ventilating tunnels; water flowing along in open conduits, rising in upright pipes, falling again in showers or leaping in a cascade to form a lake below, and all this to pass through the same round again. So diverse, and often so opposite or contrary were the movements that were going on, that one would have thought that each must have been produced by a separate and special force. But no; that whole assemblage of machines filling the vast edifice, and performing so many different operations, were impelled and kept in motion by one power proceeding from one source—and that was the far-famed "Corliss Engine," situated in the centre. When this stopped all stopped, and there was a great silence; and when this moved, all moved with it, and there was again a general whirr and rattle all around. Every movement and operation was dependent upon that one central power.

Now, what this great engine was to Machinery Hall,

that (and much more) the Sun is to the world in which we dwell. The solar orb is the origin of all the movements and activities observable in every province and department of nature. But for the energies imparted by the Sun, the earth would be a world, not only without life, but without a movement or a sound among all its elements,—a world dark, still, and silent as the grave.

All the currents and commotions that take place in the *Atmosphere* are produced by the Sun's heat. The heat of the sunrays, being reflected from the surface of the earth, expands and changes the density of the overlying air, that is, renders it lighter, and which, in consequence ascends, while the colder and heavier air rushes in to fill its place. And these motions in the atmosphere are our Winds. All this may be made plain by a simple experiment. Let the door between a cold and a heated room be thrown open, and let a lighted candle be held in it. Near the floor the flame is strongly carried toward the warm room by the inrushing current of cold air; but near the top of the door it is just as strongly driven towards the cold room by the outgoing current of hot air. Here we have two currents, or winds, sliding over each other, and moving in opposite directions. Precisely similar are the effects produced by the Sun's heat in the atmosphere at large.

What occurs between the two rooms takes place on a grand scale between the equatorial regions of the globe and those of the poles. Here the polar region corresponds to the cold room, and the equatorial to the heated room. The air around the poles, being cold and heavy, flows along the earth's surface toward the equator; and having reached the torrid zone, it becomes heated and ascends to the higher elevations of the atmosphere, where it flows back over the colder air towards either pole, to begin

again the same round. Thus two lower currents from the poles to the equator, and two superior currents from the equator to the poles are perpetually maintained by the Sun's heat. From these currents result the famous Trade Winds, which on either side of the equator blow regularly in one direction the year round. In the same manner are produced the Monsoons of the Indian ocean, the Sea and Land Breezes along the coasts of continents and islands, and in short all the local winds of the globe. All other atmospheric commotions—Tornadoes, Cyclones, and even those disturbances in the electric equilibrium of the air which give rise to the phenomena of thunder and lightning—are to be traced to the Sun's rays as their ultimate cause.

The Sun's heat, likewise, produces all the movements that prevail in the *Ocean*, the tides excepted. The waters of the sea are perpetually agitated in several ways, and in various directions; but the moving power that effects all is the solar influence. Heated by the Sun, vast quantities of vapor arise from its surface; but in all this not a particle of the salt it contains ascends. Hence in the intertropical regions, the great amount of evaporation which takes place leaves behind it a large amount of salt, which renders the water still saltier, and, consequently, heavier. In the polar region, on the contrary, the slowness of evaporation, together with melting snows and glaciers, contributes to keep the ocean waters fresh and light. Hence results a perpetual circulation in the sea, as in the atmosphere—the salt and heavy waters of the equatorial region sink and flow along the bottom towards the poles to displace their lighter and fresher waters, while these in consequence are forced into a contrary current along the surface towards the equator, to fill up the vacancy which the dense water

leaves behind. In this way there is maintained in the great oceans of the globe a perpetual circulation from the equator to the poles, and from the poles to the equator; and thus every drop of the ocean, down to its greatest depths, is kept in constant motion and exchange by the Sun's heat. In a similar way, viz., by unequally heating different portions, the Sun's rays create and perpetuate various distinct currents and streams in all the oceans of the globe, of which the Gulf Stream in the Atlantic, and Humboldt Stream in the Pacific, are notable examples. To all this we may add that, by being the immediate cause of all winds and hurricanes, the Sun's heat becomes the moving power that raises every wave that ruffles the ocean's surface, and that hurls every billow which breaks upon its thousand sinuous shores.

Again: To the Sun's heat are to be ascribed the perpetual flow of all the *Rivers, Springs* and *Fountains* of the globe. These could have no existence but for the untiring agency of the solar orb. It is his warm beams that raise from the ocean the vapors which form the clouds, and that set in motion the winds which carry those clouds from the distance of hundreds and thousands of miles to distil their precious contents over plains and mountain heights, and thus supply the water that flows together to form streams, and percolates through the soil and rocks to produce the springs that flow perpetual from the mountain sides. The Sun is the moving power, the warm heart, that keeps in circulation all the fluids of the earth. If he were to suspend his energies, every river would speedily vanish from its channel, every lake leave its basin dry, and every spring cease its flow. But for the solar heat, not a cloud would ever fly across our skies, not a shower would ever descend upon the land, not a rivulet would ever murmur among the hills.

All the water of the globe would be collected into the seas, and there would remain as vast and stagnant pools.

Thus we see that the Sun is the motive power which keeps in play all the great elements of our world. It is, moreover, the vital force that sustains all that live, or move, or grow upon its surface.

All *Vegetation* is the product of the Sun's energy. It was under his potent and varied influences that the soil was formed and fitted to bear vegetation; and it is by his vivifying action that it is enabled to draw its support from inorganic matter. It is the chemical force resident in his rays that imparts to the leaves of trees and plants and vegetables their power to give out their oxygen, and to draw from the atmosphere the carbon which is to build up their woody fibres. In short, it is by his energies that the whole process of germination, growth, and fruit-bearing is carried on. It is the power of the Sun, therefore, that annually clothes the fields with their verdure, and enrobes the forests in their foliage. And this brings us to another interesting fact:

All *Animal Life and Strength* are sustained by the Sun. Herbivorous animals feed upon and acquire their strength from vegetables; but vegetables are the productions of the Sun; therefore such animals derive their strength from the Sun's power. Carnivorous animals do the same, only by an intermediate step. And all animals grow strong or weak according as they are well or ill supplied with these transmuted energies of the solar orb. The same is true of Man himself. In order to health and strength, he must eat, and does eat; and all his food, like that of the inferior animals, is originally derived from the energy of the Sun. In his case, there has been a transmutation of the energy of the Sun's rays into the

substance of plants, and from the plants into the substance of the sheep and ox, and from the sheep and ox upon which he has fed into his own frame; and thus all his energy, as is obvious, is ultimately due to the Sun's rays. The heat of our blood, the motion of our hearts, and the capacity for work in our limbs—all represent energy which originally streamed from the Sun. Hence it may be said, not simply in a poetic sense, but in a material sense, that we are "the children of the Sun."

Once more: All the *Machines and Engines* contrived by man are driven by the energies of the Sun. Wind, water, or steam may be the immediate agencies employed, but all these apart from the Sun could have no power at all; whatever force they possess or exert has been derived from him. Ships cleave the waters and perpetually cross the Atlantic, some going East and some coming West, but it is the Sun that propels them all, for it is his heat that raises the wind that fills every sail. The stream flowing from the mountain heights is directed to accomplish various mechanical purposes—to turn wheels, lift hammers, grind wheat, spin cotton, saw timber, etc. But all the power which that stream exhibits in these operations originates not in itself, but has been acquired at the expense of the Sun, whose energies lifted it from the deep to those elevations from whence it descends. All that the stream does is simply imparting to the machines on its banks the force which it has derived from the Sun. Again, the Steam-Engine drives the machinery of the huge factory through the year, draws the ponderous train across the continent, and propels the magnificent ship around the globe; but all the power that engine possesses has been acquired from the Sun, for the steam that moves its iron arms is generated by the transmuted energies of that orb; that is, by wood from the living

forest, or wood of primeval growth laid up unnumbered ages since in the form of coal. Unsupplied with these products of solar energy the steam-engine would be a powerless and useless thing.

Such is the dependence of our world upon the great orb of day. Every motion, every manifestation of power in sea or land or air, organic or inorganic, mechanical or purely physical, has its origin in the Sun. The winds and the waves, the rain and the dew, the flowing streams and the bubbling fountains, are all the products of his strength. From him come the energies, that cover our plains and valleys with corn, that clothe our mountains with forests, and that waft our commerce over the distant seas. From him originally came the power which the fire has to warm and the lamp to enlighten our dwellings. It is the Sun that weaves our garments and prepares our daily food. It is the Sun that renews our strength from day to day, and that keeps in activity our hearts and lungs from hour to hour. If we take a step, if we lift an arm, if we write our name, the power to do so has been derived from the Sun. If the breeze fans our languid cheek, or the cup of cold water moistens our fevered lips, we owe the comfort to the energies which he has put forth.

But in speaking thus of the Sun, let not the reader suppose that we ascribe to the creature what belongs to the Creator. Our meaning is, that the Sun is the *instrumental*, not the *efficient*, cause of all this. The Sun is but the means or instrument which the All-wise and Omnipotent God has contrived and empowered to effect all the operations now described upon our globe. Whatever energies the Sun may possess or exert, all have been bestowed and all are sustained by Him, the sole and original source of all power. All the activity of material

nature, from its minutest to its grandest departments, is nothing else than the activity of the Great Supreme. The power evinced is his power, and the order pursued is but the direction of his wisdom. This is the plain declaration of Holy Writ; and with it agrees that of modern science, whose recent and most sublime deduction is, that all physical powers are but different phases of one and the same power, and that that one power is the Will-power of the Almighty, "who worketh all in all." Well, therefore, may it now be asked,

> "Who dares His name profane,
> Or belief in Him disclaim,
> Veiled in mystery though He be, the All-enfolder?
> Gleams across the mind His light,
> Feels the lifted soul His might,
> Dare it then deny His reign, the All-upholder?"

## Teachings.

Now, as the Sun of nature is the cause of all the motion and activity displayed in the material world, *so the Sun of Righteousness is the origin of all the spiritual life and energy witnessed in the moral world.* What the solar globe by its vivifying rays is in the realm of matter, that (and infinitely more) is Christ by his quickening Spirit in the realm of mind. He is the Author, and Sustainer, and Saviour of the spirits of all flesh.

As our planet deprived of the Sun's rays would become, and would remain a lifeless ball, with all its great elements motionless and stagnant; so the human race, denied the life-giving power of the Sun of Righteousness, would have been and would have continued, spiritually, a lifeless and dead race. By departing from God mankind became dead—dead in law, and dead in trespasses and sins. Moved by infinite compassion and love, to restore them to life, he came into our world—came that he might re-

deem them from the condemnation of the law by the offering of himself a sacrifice in atonement for their sins, and to quicken them to spiritual life by the free gift of his Holy Spirit. And thus he is become the Divine and Glorious Orb from whom flow all light and life to benighted and lost humanity. He is the original source of all spiritual energy. Apart from him there exists not a throb or pulsation of true spiritual life in any human bosom. All spiritual activity, all spiritual aspirations seen or known among men have their origin in him. He is the life of the world.

Christ is the origin of spiritual life in every *individual soul.* As the first impulse of germination and growth in the seed sown is due to solar influence, so the first motion of the seed of truth deposited in the heart is due to the energies of the Divine Orb of Righteousness. It is the play of his gracious beams, so to speak, that produces the first faint indication of quickening within him. It is he that infuses and fosters the principle of the *new life;* so that presently he feels himself actuated by new instincts and new appetites. The sacred rays still descending upon his soul, the pulse of holy passions begins to beat toward spiritual objects; the vital warmth of love spreads itself through his whole frame; he breathes out his desires and prayers before God; like a new-born infant he begins to cry after him, and in time learns to lisp his name with filial endearment, saying, Abba, Father. He hungers and thirsts after righteousness; and as every kind of life must have its proper nourishment, so his spiritual life feeds on Christ, the living bread, and the sincere milk of the words of Christ. He now feels himself possessed of new sensibilities; divine things make deep and tender impressions on his heart; the great realities of religion and eternity affect him in

a manner unknown before. Moreover, he finds his soul actuated with new vigor and earnestness in the service of God, and in all the duties he owes to his fellow-creatures. Such is the regenerative process carried on and accomplished under the influence of the benign beams of the Sun of Righteousness.

Again: Christ is the life of the *Church*, as a social body. He is the Head, in whom all are united. He is the living bond that holds all her members in union and communion with one another. And he is the warm and living Heart of that body, from which flows the vital fluid that maintains its life, its activity, aye, and its very existence. Add to all this, that to his gracious influences all the active piety, all the good works of the church are to be ascribed. As the streams and springs which flow from the elevations of the earth to refresh and fructify the plains below are all due to the Sun, which supplies the rain that forms them; so all the streams and rills of charity and beneficence that flow from the heights of Zion to benefit and bless the world are due to the Sun of Righteousness, who showers down his grace thereon. He it is that softens the heart to tenderness and pity; that moves the hand into acts of kindness, and the mind into deeds of generosity; and that inspires the soul to pursue a course of disinterested benevolence towards friends and foes. It is he that worketh in all both to will and to do these things. And to his blessing are to be traced whatever measures of success may attend them.

All spiritual good accomplished in the *world* is due to the all-pervading influence of the Sun of Righteousness. If the waters are moved for the healing of spiritual impotents, it is through his power. If the breath of life passes over the valley of dry bones, so that sinews and

flesh come upon them, and skin covers them, and life returns, and they stand up a great army; it is he that breathes and doeth all this. If the streams of the River of Grace make glad the city of God, the holy place of the tabernacle of the Most High, it is he that creates and perpetuates its flow. If our spiritual machinery erected on the banks of that river—our Bible, and Educational, and Missionary Societies—are kept in successful operation, he is the ultimate power that impels them all. If the tropical regions of the Gospel send forth perpetual currents of their warm and vitalizing air toward the dark and cold polar regions of heathenism, it is through the energy of his Spirit moving upon the hearts of his people. If the Christian derives strength or comfort from a good book, or from the pulpit, that strength or comfort he owes to the Sun of Righteousness, from whom it was first transferred into the holy scriptures, and then by his Spirit from the scriptures into the mind of the writer or preacher, and finally from him into his own soul. All power and all disposition for spiritual good are but the transmuted energies of the Sun of Righteousness, the original Fountain of all good.

## ANALOGY IV.

*As the Sun's warm rays, though adapted and designed to minister to the welfare of the whole living world, yet sometimes create storms and whirlwinds that spread destruction far and wide,—so the divine teachings of the Sun of Righteousness, though designed and fitted to promote and secure the best interests of the whole human race, yet sometimes excite hatred and persecution that spread and devastate whole kingdoms.*

### PHENOMENA.

THAT the Sun is constituted and designed to minister to the general welfare of our world—that its energies

are in daily and hourly operation, and that in a thousand different ways, for the well-being of all the plants and animals which occupy its seas and lands—that it is the source of light, and life, and health, and happiness to all human beings dwelling upon its surface—must be sufficiently obvious to the reader from the numerous and diversified facts stated and illustrated throughout the whole of the foregoing part of this work. The Sun is the common, impartial, and abiding benefactor of the whole world. Yet, owing to certain contingencies in terrestrial elements or localities, its rays, at times, become the occasion of more or less extended calamities and evils, wrought for the most part by the commotions which they produce in our atmosphere.

The Sun's heat, as explained in the preceding Analogy, is the moving cause of all atmospheric currents or winds. The speed of these, however, is often greatly affected by the presence or absence of vapor in the atmosphere, by the influence of electricity, and by the conformations of localities on the earth's surface. Mountain ranges, extensive plains, and warm streams in the ocean, have a powerful influence upon the winds.

The *force* of winds, of course, is determined by their velocity. The annexed Table exhibits the amount of force exerted by winds, travelling at different rates, on a surface standing perpendicularly to the line of their direction.

| Common Names of the Winds. | Velocity in Miles per Hour. | Force in Pounds per Square Foot. |
|---|---|---|
| Zephyr, hardly felt | 1 | 0.005 |
| Breeze, perceptible | 3 | 0.044 |
| Fresh Breeze | 5 | 0.123 |
| Pleasant Gale | 15 | 1.107 |
| Brisk Gale | 25 | 3.075 |
| High Winds | 35 | 6.027 |
| Very High Winds | 45 | 9.963 |
| Hurricane | 60 | 17.715 |
| Violent Hurricane | 100 | 49.200 |

From the above figures, it will be seen at once, what a tremendous force a high wind exerts upon an expanded tree, or a large building, or upon the outspread sails of a vessel, presenting an opposing surface of many thousands of square feet to its furious career. Nor, when we duly consider this fact, need we be surprised at the destruction often wrought on sea and land by violent tempests. In the great storm, which occurred in England, on the 27th of December, 1703, the extraordinary power of the wind created a noise hoarse and dreadful, like thunder, which appalled every heart. Horror and confusion seized upon all, whether on land or at sea. By the fall of dwellings 123 persons were killed, among whom were the bishop of Bath and his wife, who perished amid the ruins of the Episcopal palace. In the rivers Severn and Thames no less than 8,000 persons lost their lives. On the coast many ships were blown away, and never heard of afterwards. Orchards, houses, churches, corn, trees, gardens—all were damaged by its fury. Small buildings were swept away like chaff; above 800 dwelling-houses were laid in ruins; 2,000 stacks of chimneys were blown down in London; 15,000 sheep were destroyed on the banks of the Severn, and 20,000 in the county of Kent; 300 ships, 500 wherries, 300 ship-boats, and 100 lighters and barges, were entirely lost. The Eddystone lighthouse was precipitated into the surrounding ocean, along with its ingenious Architect and those that were with him. The damage done in the city of London alone by this storm was estimated by millions of pounds sterling. Such are some of the dreadful effects of the invisible atmosphere which surrounds us, when put in rapid motion. Light as its particles are, no human wisdom or power, in such cases, can avert its force, or withstand its dreadful and destructive violence.*

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*See *Philosophical Transactions*, for 1704.

Strong winds, in their onward progress, sometimes assume a spiral motion, and hence are called Whirlwinds or Tornadoes. This whirling motion is supposed to be produced by the lateral action of opposing currents, or the influence of a brisk gale upon a portion of the atmosphere at rest, in a manner analogous to the eddies that arise at the junction of two streams, flowing with unequal velocities; or the air-whirls that occur when a wind sweeps by the corner of a building, and strikes the calm air beyond it. The existence of such opposing currents is fully proved by the observations of aeronauts, and of travellers on the summits of lofty mountains. The whirl, frequently, originates in the higher regions of the atmosphere, and as it increases in violence, descends, its base gradually lowering until it touches the earth's surface. Kaemtz was so fortunate as to witness the actual formation and progress of such a whirling in the atmosphere; when on the summit of the Rigi, in Switzerland, he beheld two masses of fog approaching each other, in the valley of Goldan, while the air around him was calm, and the sky serene. As soon as they united, a gyratory motion was perceived, the fog rapidly extended, accompanied with violent gusts; and after the lapse of a few moments, a furious storm fell upon the lake of the Four Cantons, far below, in the midst of which a water-spout was formed.

Tornadoes are of frequent occurrence in the United States. "I have often observed the paths of such storms," says Lieutenant Maury, "in the forests of the Mississippi. There the track of these tornadoes is called a 'Wind-road,' because they make an avenue through the wood straight along, and as clear of trees as if the old denizens of the forest had been cleared with an axe. I have seen trees three or four feet in diameter torn up by the roots,

and the top with its limbs, lying next the hole whence the root came." Another writer, and an eye-witness of these American storms, thus describes their violence: "I saw to my great astonishment, that the noblest trees of the forest were falling into pieces. A mass of branches, twigs, foliage and dust moved through the air, whirled onward like a cloud of feathers, and passing, disclosed a wide space filled with broken trees, naked stumps, and heaps of shapeless ruins, which marked the path of the tempest." A whirlwind of this character passed through Northern Ohio, on the 4th of February, 1842, which wrought great destruction. Large buildings were lifted entire from their foundations, carried a distance of several rods, and then dashed to pieces. The fragments were strewed all along the track, and some were carried a distance of seven or eight miles. Large oak-trees, two feet in diameter, were snapped off like reeds, and others were so twisted as to be reduced to a mass of splinters not much thicker than a man's finger. The breadth of the track did not much exceed half a mile, and the most destructive portion was still more limited. This tornado advanced over the earth with a velocity of thirty-four miles per hour; and its duration at one place did not much exceed one minute.

Other and more destructive tempests still are called Hurricanes. These are terrific storms, accompanied by thunder and lightning, and are distinguished from every other kind of tempests by their extent, their irresistible power, and the sudden changes that occur in the direction of the wind. Though known in other climates, they rage with the greatest fury in the tropical regions. The rich products of the plantations are destroyed in a moment, forests are leveled, the firmest edifices prostrated, and their roofs whirled aloft into the air, which is filled

with the flying fragments of a thousand ruins. Upon the coasts, the waves rush land-ward with appalling violence, lining the harbors and the adjacent shores with the cargoes and wrecks of shattered vessels. In the great hurricane of 1780, which commenced at the Barbadoes and swept across the whole breadth of the North Atlantic, fifty sail were driven ashore at the Bermudas, two line-of-battle ships went down at sea, and upwards of 20,000 persons lost their lives on the land. So tremendous was the force of this hurricane, that "the bark was blown from the trees, and the fruits of the earth destroyed; the very bottom and depths of the sea were uprooted; forts and castles were washed away, and their great guns were carried in the air like chaff; houses were razed; ships wrecked; and the bodies of men and beasts lifted up in the air and dashed to pieces in the storm."

Another hurricane which occurred in August, 1831, transformed the Barbadoes into a desert, and killed no less than 5,000 persons. There were observed some forebodings of a storm the evening before, and a little after midnight it burst forth in all its fury. At Dominica, St. Vincent, Cuba, and Aux Cayes, the tempest did serious injuries; the rising of the sea at the latter place caused the death of 600 individuals. At New Orleans the effects were severely felt, and at Natchez, 300 miles up the Mississippi, the court-house was overturned. This hurricane began in the Barbadoes on the 10th and reached New Orleans on the 16th, moving over a distance of 2,300 miles, at the rate of 383 miles per day.

In May, 1787, a hurricane blew in India from the north-east, when the ocean waves rolled inland to the distance of twenty miles, on the coast of Coromandel; more than 10,000 of the inhabitants found a watery grave, and the carcasses of 100,000 cattle were strewed upon the marine

S. J. Ferris, del.

A HURRICANE.

mud. And in October, 1864, a fearful storm swept over the Bay of Bengal, during which all the ships in the harbor of Calcutta were swept from their anchorage, and driven one upon another in inextricable confusion. Fearful as was the loss of life and property in the harbor of that city, the destruction on land was far greater. A vast wave swept for miles over the surrounding country, embankments were destroyed, and whole villages, with their inhabitants, were swept away. It was estimated that over 50,000 people perished in this fearful hurricane.

Over the vast sandy deserts of Arabia and Northern Africa there not unfrequently sweeps a fierce hot wind called Simoon, which is an object of as much dread to the traveller on land as the hurricane or cyclone at sea. Its temperature sometimes rises as high as 128° Fahr.; and it comes loaded with clouds of fine dust, stifling alike to man and beast. Under its effects, the lungs are contracted and become painful; respiration becomes short and difficult, the skin parched and dry, and the whole body is consumed with internal heat. The sand-drifts formed by this wind, in its westward course, have entombed cities and temples, buried colossal figures of ancient art, and are now making aggressions on the fertile soil of Egypt. The classical reader will recall the narrative of Herodotus, of the loss of the army of Cambyses in the desert of Lybia. This ambitious prince having routed the Egyptians, and heard of the reputed wealth of the long-lived Macrobians, resolved to make war against that Ethiopian race. Having reached Thebes, he separated his army into two divisions, directing 50,000 of his troops to advance against the Ammonians, and pillage the temple of Jupiter Ammon. It appears that they reached the Lybian Oasis, but they never returned, for a sand-

wind arose from the south, near to the temple of Ammon, and in its violent blast overwhelmed the army, utterly destroying them, so that no one ever returned to tell the tale. Such, too, was nearly the fate of the soldiers of Alexander, about two centuries later, while they crossed the desert from Memphis to Jupiter Ammon, a twelve days' journey.* Every trace of those invading thousands has long since been obliterated, and even the object of their unhallowed cupidity has vanished from the face of the earth;—but the hot blasts of the desert still visit those regions, and the moving sands still drift before them around the site of Ammon, as if to portray to the living the vanity of all earthly greatness, and to proclaim the folly of all human ambition.

A recent English traveller, Rev. F. L. Porter, has given the following vivid description of a simoon he encountered in Southern Palestine: "On emerging from the olive groves of Gaza, the desert was before us—bare, white, and monotonous, without a solitary tree, or 'the shadow of a great rock,' or a single patch of verdure. As we rode on, we had overhead the bright sky and blazing Sun; and beneath, the flinty soil, reflecting burning rays that scorched the weeds and stunted camel-thorn, and made them crackle like charred sticks under our horses' feet. As the day advanced, the hot 'sand-wind' came upon us, blowing across the great 'Wilderness of Wandering.' At first it was but a faint breath, hot and parching, as if coming from a furnace. It increased slowly and steadily. Then a thick haze, of a dull yellow or brass color, spread along the southern horizon, and advanced, rising and expanding, until it covered the whole face of the sky, leaving the Sun, a red globe of fire, in the midst. We now knew and felt that it was the fierce

* See *Herod.*, lib. III., cap. 26; and *Quint. Curt.*, lib. IV., cap. 7.

Simoon. In a few moments, fine, impalpable sand began to drift in our faces, entering every pore. Nothing could exclude it. It blew into our eyes, mouths, and nostrils, and penetrated our very clothes, causing the skin to contract, the lips to crack, and the eyes to burn. Respiration became difficult. We sometimes gasped for breath; and then the hot wind and hotter sand rushed into our mouths like a stream of liquid fire. We tried to urge on our horses; but though chafing against curb and rein only an hour before, they were now almost insensible to whip and spur. We looked and longed for shelter from that pitiless storm, and for water to slake our burning thirst; but there was none. The plain extended on every side, smooth as a lake, to the circle of yellow haze that bounded it. No friendly house was there; no rock or bank; no murmuring stream nor solitary well. It seemed to us as if the prophetic curse pronounced by the Almighty on a sinful and apostate nation was now being fulfilled. We could see, at least, in the whole face of nature, in earth and sky and storm, how terrible and how graphic that curse was:—'Thy heaven that is over thy head shall be brass, and the earth that is under thee shall be iron. The Lord shall make the rain of the land powder and dust: from heaven it shall come down upon thee' (Deut. xxviii. 23, 24). The storm was at its height when we saw, rising up before us, a low, white mound. As we approached we could distinguish heaps of ruins and rubbish; and on reaching it, and pressing our panting steeds up its shelving sides in search of some rude shelter, we scrambled over large hewn stones, and fragments of marble columns, with here and there a piece of carved cornice or sculptured pediment protruding from the dust. Our guide had dashed on in front, and we eagerly followed, heedless of stones and pits and prostrate

houses—in silence, but hoping for some kind of relief. A cry of joy burst from the whole party as, on passing the crest of the tell, we saw a low broken wall, and not far from it a number of stone troughs round the mouth of an old well. The well was dry, but we crouched down under the shelter of the wall, and our poor horses came close to our feet, lowering their heads and shutting their eyes to escape the drifting sand. In about an hour the simoon had spent its fury, and we prepared to resume our route."*

The foregoing are examples of the violent and destructive commotions which the Sun's rays occasionally produce in our atmosphere, though those rays are fitted and designed to promote the general welfare of the world. While we are assured that all the elements and forces of nature, even to their minutest operations, have been so adjusted and combined as to accomplish the purposes of infinite wisdom and love; yet it is difficult for us to discover or understand the particular advantages secured by such visitations as those of the Tornado, the Hurricane, or the Simoon. The evils they inflict are obvious, but the good they accomplish is obscure. But that even these harmonize with the ultimate ends of God in creation there can be no doubt. And since we are able, in some cases, to trace our escape from great evils and our enjoyment of certain advantages to such tempests, these instances should dispose us to believe that similar benefits are secured by all others, however inscrutable they may appear.

As remedies that give pain must sometimes be resorted to for the preservation of the individual, so correctives that may involve partial evils must be employed for the good of the race. And a Tornado may prove, and in

* *Giant Cities of Bashan*, pp. 210–212.

some instances certainly has proved, such a corrective. "In 1780, Grenada, in the West Indies, was visited by one of these. Unlike similar phenomena, this was to the inhabitants a providential deliverance. Some time before, the *Formica Saccharivora*—a species of ant—appeared in such numbers as to threaten the annihilation of the sugar-cane; and the people, after in vain trying many expedients, and offering large rewards, were contemplating leaving the island. By this tempest, an Almighty Arm accomplished what man with all his appliances had signally failed to overcome—*the ant was exterminated!*" Great storms have often saved other countries from utter devastation by locusts, by sweeping them all away into the open sea, as was done for Egypt in the day of Moses.

The commotions which solar heat produces in the atmosphere serve to restore and preserve its salubrity. It is the common experience of men everywhere, that great storms are followed by a sensible improvement in the air, and by feelings of increased comfort. Hence it may be reasonably inferred that they are designed to correct something that is going wrong in the great laboratory of nature. Among other effects, we have ground to believe that they are often the means of removing malarial and other noxious exhalations, which are the prime causes of epidemic and endemic diseases. Of this there occurred a notable illustration in England during the first visitation of what the common people called the *Sweating Sickness.* "On new year's day," says Hecker, "a violent tempest arose in the southeast, and by purifying the atmosphere relieved the oppression under which the people labored, and thus, to the joy of the whole nation, the epidemic was swept away, without leaving a trace behind."

In various parts of the world, storms have been observed to check pestilences which human skill had failed to subdue. "On the banks of the La Plata, in South America, there is a prevailing wind which comes charged with the germs of intermittent fever, from the marshes lying to the north. The wretched inhabitants droop and sicken and shiver into their graves. Suddenly a hurricane sweeps over the pampas from the cold summits of the Andes in the southwest, and in a few days the seeds of the disease are roughly yet effectually expelled. It has, moreover, been remarked that cholera epidemics in this country have usually been attended with great stillness in the atmosphere, by which the operation of causes tending to concentrate the disease was no doubt favored. Therefore, when we hear the stormy wind howling round our houses, and sweeping through our courts and closes, let us think of it as one of Nature's most efficient sanitary agents, by which she renovates the air that was tainted through stagnation, and scatters the seeds of the pestilence that were growing up for our destruction."*

"All Nature is but art, unknown to thee;
All chance, direction, which thou canst not see;
All discord, harmony not understood;
All partial evil, universal good:
And, spite of pride—in erring *reason's* spite,
One thing is clear—whatever is, is right."—*Pope.*

## Teachings.

The foregoing phenomena, witnessed in the material world, find a striking parallel in the moral world. Though the Sun was designed and constituted to be the benefactor of our whole globe, and though its warm and luminous beams are actually in perpetual activity for the

* *Benedicite*, p. 169.

good of every living thing, yet owing to certain conditions of terrestrial elements or localities, its rays, at times, as we have just seen, become the occasion of destructive storms and tempests; so the divine teachings of Christ, the Son of Righteousness, though all designed and fitted to promote the best welfare of men, in time and eternity, yet *owing to the wickedness of the human heart, these often excite hatred and persecution, which, like furious tornadoes or hurricanes, carry death and devastation through whole nations.*

For this opposition and persecution no just cause or reason can be found in the character of the Great Teacher, or in the nature of his instructions. He is good, supremely good; and all his words are pure and beneficent like the sunbeams. The spirit in which he speaks is that of love and disinterested benevolence. The lessons which he teaches are true and wise and good. The motives by which he seeks to influence men are pure and elevating. The duties he enjoins are just and reasonable. And his precepts all are fitted and graciously designed to make mankind wiser and better and happier, both for the life that now is and for that which is to come. In short, so wise and excellent and divine are the instructions of his Gospel, that obedience—cordial and universal obedience—to them would not only banish from among men all the iniquities and vices which now afflict them, but restore them to the enjoyment of the innocence, security and happiness which reigned in the primeval paradise.

Yes, the inherent tendency and gracious purpose of the Gospel is to restore the reign of Love; to restrain and subdue the evil passions of men, to allay animosities and dispose to peace, to inspire the spirit of kindness and mutual sympathy, to change enemies into friends, and

persecutors into benefactors; to make rulers just and citizens loyal, the seller truthful, the buyer honest, the master forbearing, and the servant faithful; to convert the cruel husband to a loving companion, the austere father to a gentle parent, and fractious children to dutiful sons and daughters; to shed a mild, kind and peaceful spirit over all the relationships of human societies, and to inspire every individual soul with the joyful and transporting assurance that, when called to leave the scenes of earth, he shall come into the possession of an inheritance incorruptible, undefiled and that fadeth not away. For this end did the Sun of Righteousness arise upon our world with healing in his beams, and for this end he continues to shine upon our sin-polluted and sin-ruined race.

Such is the Gospel, such is its amiable spirit and blessed influence. Yet, such is fallen humanity that, when its pure and beneficent beams are shed upon them, it becomes the occasion of violent agitations, of storms of evil passions. And this for the reason that "the carnal mind is enmity against God, and desires not the knowledge of his ways. Men love darkness rather than light, because their deeds are evil. For every one that doeth evil hateth the light, neither cometh to the light lest his deeds should be reproved." Hence, as the Sun of nature cannot shine upon certain rank ferns and marshes of the earth without becoming the occasion of pestilence and death; so neither can the Sun of Righteousness shed his light upon the corrupt hearts of men, without becoming the occasion of opposition and hatred. And this wicked spirit, not unfrequently breaks out, like tempests in the atmosphere, into open and violent persecutions, carrying suffering and sorrow into multitudes of peaceful and happy homes. The desolation and bloodshed, which

have by these means swept over some of the fairest portions of the earth's surface, are past all estimation. If tornadoes and hurricanes have had their thousands of victims, persecution has had its millions.

No sooner had the light of the Sun of Righteousness shone upon the world than human depravity was thus set in commotion, and the work of persecution began. What a tempest of malevolent passions gathered around the Blessed Saviour himself! What jealousy and hate and violence assailed his Sacred Person! What relentless malice and cruelty at last extinguished his holy and devoted life in death!

Nor was it long before his humble followers were exposed to similar treatment. A few of the expressions that occur in the earliest history of the church will serve to describe the whirlwind in which they were perpetually involved. When they began to proclaim the good word of life, we read that, "The rulers being grieved that they taught the people, and preached through Jesus the resurrection from the dead, they laid hands upon them, and put them in prison, and commanded them not to speak at all, nor to teach, in the name of Jesus."—Again, "Then the high priest and they that were with him were filled with indignation."—Again, "When they heard them, they were cut to the heart, and took counsel to slay them."—Again, "And when they heard these things, they cried with a loud voice, and stopped their ears, and ran upon him with one accord, and cast him out of the city; and they stoned Stephen, calling upon God, and saying, Lord Jesus, receive my spirit."—"At that time there was great persecution against the church which was at Jerusalem, and they were all scattered abroad throughout the regions of Judea and Samaria."

A similar whirlwind of hatred and opposition appears

to have attended the footsteps of the apostles as they went forth to preach the Gospel among the Gentiles. At Antioch, Iconium, Lystra, Philippi, Thessalonica, Corinth and Ephesus, they had to encounter uproars and violence, and to flee for the preservation of their lives. Bonds and afflictions awaited them whithersoever they went.

As time advanced and Christianity spread, more general and terrible persecutions than all these swept over the broad provinces of the Roman Empire. While the Romans tolerated every kind of religion from which no danger to the public safety was apprehended, they would not endure that any one should deride or attempt to explode the religion of the state; they held that between this and the government there existed such an intimate connection and dependence, that whosoever attempted to undermine the former could not but be hostile to the latter. No reflection, therefore, on the religion or the gods of the commonwealth would be tolerated. But Christians, by the very principle and spirit of their religion, felt impelled to oppose and denounce all idolatry, and ceased not to urge citizens of all classes to renounce their vain superstitions, to forsake their false gods, and to abandon forever their degrading rites and ceremonies. They intended no ill to the state, indeed; but their course was so interpreted. Hence the *emperors*, the *senate*, the *presidents* and the *magistrates* sought to arrest the progress of Christianity by means of the most rigorous laws and punishments. And private interests and selfish considerations among the people were nowhere wanting to urge on the execution of these laws and penalties to the very letter. Attached to the service of that host of deities which the Romans worshipped, there was an immense number of *priests*, *augurs*, *soothsayers*, and *ministers*

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ROME SET ON FIRE BY NERO.

of inferior order, who clearly saw that the establishment of the Christian religion would be the end of all the emoluments, honors, and advantages which they enjoyed. Associated with these in their efforts to oppose and put down Christianity, there was an innumerable multitude of persons of various other occupations, to whom the public superstitions were a source of no small gain; such as *merchants* who supplied the worshippers with frankincense and victims, and other requisites for sacrifice; *architects, vintners, gold and silver smiths, carpenters, statuaries, sculptors, players* on the flute, *harpers*, and others; to all of whom the heathen polytheism with its numerous temples, and long train of priests, and ministers, and ceremonies and festivals was a principal source of affluence and prosperity.*

Such was the Roman world. It is obvious that, in all respects, it was fitly conditioned for the production of fierce gusts and wide-sweeping storms, on the introduction of such a system of religion as Christianity. As the Sun's rays, in tropical regions, falling upon extended portions of the atmosphere laden with vapors and charged with electricity, often produce the most destructive hurricanes: so the bright and pure beams of the Sun of Righteousness falling upon such a mass of superstition and errors and selfishness, could not but excite bitter hate and be productive of furious opposition. And so it came to pass.

In the reign of Nero, about the middle of November, in the year 64, there broke out with all the suddenness and destructiveness of a tornado, a most violent persecution of the Christians. Multitudes of them were seized, and on utterly false charges, or as the common enemies of mankind, were condemned, and hurriedly executed

* See Mosheim's *Historical Comments*, Vol. I., p. 129, etc.

with every ingenuity of cruelty and every aggravation of insult and derision. They were covered with the skins of wild beasts, and torn in pieces by devouring dogs; they were fastened to crosses in the most agonizing positions; and many were wrapped up in combustible garments, then suspended upon upright stakes and set fire to, that when the daylight failed, they might, like torches, serve to dispel the darkness of the night. For this tragical spectacle Nero lent his own gardens, and exhibited at the same time the public diversions of the circus; sometimes driving a chariot in person, and sometimes standing as a spectator, while the shrieks of women and the moans of strong men, roasting in flames and burning into ashes, supplied music for his ears. For four long years did this dreadful work of blood continue under his sanction.

The example of Nero was but too closely followed by his successors. A *second* general persecution took place under Domitian, beginning in the year 95, when no less than 40,000 are supposed to have suffered martyrdom. A *third* began under Trajan, A. D. 100, and was carried on with great violence for several years. A *fourth* broke out under Antonius, beginning in A. D. 136, when the Christians were banished from their homes, forbidden to show their heads, reproached, beaten, driven from place to place, plundered, imprisoned, and stoned. A *fifth* commenced in the year 199, under Severus, when great cruelties were committed. In this reign occurred the martyrdom of Perpetua and Felicitas, and their companions. A *sixth* persecution began with the reign of Maximinus, A. D. 235, in which many bishops and Christian leaders fell. A *seventh*, which was the most dreadful ever known, opened in the year 250, under the emperor Decius, when Christians were in all places driven from their habitations,

stripped of their estates, tormented with racks, and destroyed in all horrid ways. An *eighth* began in 257, under Valerian. Great numbers of both men and women suffered death; some by scourging, some by the sword, and some by fire. A *ninth* took place under Aurelian, in 273; but this was inconsiderable, compared with the others before mentioned. A *tenth* began in the 19th year of Dioclesian, A. D. 302. In this dreadful persecution, which lasted ten years, houses filled with Christians were set on fire, and whole droves were tied together with ropes, and thrown into the sea. It is related that 17,000 were slain in one month; and that during the continuance of this persecution, in the province of Egypt alone, no less than 144,000 Christians died by the violence of their persecutors; besides 700,000 that died through the fatigues of the hard work to which they were condemned, or the exposures of the banishments to which they were driven.—It is supposed that during the first three centuries no less than 3,000,000 perished for the Christian faith.

From the reign of Constantine, when the church commenced a corrupt and corrupting alliance with the state, the storms of persecution took their rise from quite another quarter. Thenceforward men of corrupt minds and worldly ambition sought and obtained positions of emolument and authority in the church; and soon, as in the time of old, those who were born after the flesh began to persecute those who were born after the Spirit. This was carried on, with less or greater severity, through a succession of centuries. At length Martin Luther arose, and boldly and fearlessly exposed the errors and corruptions into which the church of Rome had drifted; and when he proclaimed the Gospel in its primitive simplicity and purity, and his sentiments began to spread

and acquire a hold on the public mind, the Pope and his Cardinals and Clergy united all their forces, and excited all their powers to hinder their progress and to extinguish their influence. Hence arose the most terrible persecutions the world had ever seen. Through Germany, Bohemia, Poland, Lithuania and Hungary, the blood of the saints is said to have "flowed like rivers of water." In Holland and the Low Countries, according to Grotius, no less than 100,000 suffered by the hand of the executioner.

France, likewise, was overswept once and again by these diabolical tempests. In the reign of Charles IX., after the queen dowager of Navarre, Admiral Coligni, and many other eminent persons had been destroyed by treachery or open assassination, the murderers ravaged the whole city of Paris, and butchered in three days above ten thousand lords, gentlemen, presidents, and people of all ranks. Now a horrid scene of things presented itself—the very streets and passages resounded with the noise of those that met together for murder and plunder; the groans of those who were dying, and the shrieks of such as were just going to be butchered were everywhere heard; the bodies of the slain thrown out of the windows; the courts and chambers of the houses filled with them; the dead bodies of others dragged through the streets; their blood running through the channels in torrents to the neighboring river: in a word, an innumerable multitude of men, women and children were all involved in one common destruction. From Paris the massacre spread throughout the whole kingdom. In the city of Meaux they threw above 200 into gaol; and after they had ravished and killed a great number of women, and plundered the houses of Protestants, they executed their fury on those they had imprisoned; and calling them

one by one, they were killed like sheep for the market. In Orleans they murdered more than 500 men, women, and children, and then enriched themselves with the spoils. The same cruelties were perpetrated at Angers, Troyes, Bourges, La Charité, and especially at Lyons, where they inhumanly destroyed above 800 Protestants, hanging, mangling, dragging, tearing, or throwing them half dead into the river. Nearly 100,000 perished in this massacre.—Another persecution, far exceeding in cruelty that now described, devastated this unhappy country, in the reign of Louis XIV. But as it must be painful to every man of humane feeling to contemplate these dreadful scenes of blood and cruelty, we forbear to describe them. Suffice it to say that, the fiendish barbarities practiced on men and women, mothers and infants, left those of Nero and Dioclesian far behind them, and completely in the shade!

England also has been the scene of repeated persecutions. In the reign of Henry VIII., many eminent reformers were burnt at the stake. And when queen Mary came to the throne, a severer storm still swept over the land. Hooper and Rogers were consumed in slow fires. Saunders, after having been tormented while consciousness remained, perished in the flames. Taylor was put into a barrel of pitch, and fire set to it. Eight distinguished persons, among whom was Ferrar, bishop of St. David's, were sought out, and burnt by the infamous Bonner, in a few days. Sixty-seven persons were in this year, 1555, burnt, among whom were Bradford, Ridley, Latimer, and Philpot. In the following year, eighty-five persons were burnt. Women also suffered, some of them giving birth to babes in the flames. The whole number of those who suffered death for the reformed religion in this reign amounted to no less than 277, besides many others who perished in prisons.

Ireland, likewise, has had its soil drenched with the blood of Protestants. In a few days, beginning with the 23d of October, 1641, between forty and fifty thousand were cruelly murdered in different parts of the island. Scotland also was the scene of great cruelty and bloodshed for many years.—It has been computed that no less than 50,000,000 of Protestants have at different times, and in different countries, been the victims of persecutions waged by Roman Catholics.

Thus the enlightening beams of the Sun of Righteousness, the Gospel of his love, though designed and fitted to promote the best interests of all mankind, yet, through the wickedness of the human heart, has often become the occasion of hatred, divisions, and persecutions. Has become the *occasion*, I say, not the *cause;* between these there is a wide distinction, and one that should be carefully noted, for Christianity has sometimes been wrongfully charged with all the evils attendant on persecutions. Christianity neither authorizes, nor encourages, nor countenances any of these. A timely rain is the *cause* of much good, but it may incidentally *occasion* no little harm. Medicine is often the *cause* of great relief, but through the cupidity of quacks it may become the *occasion* of cruel imposture. So the Christian religion is the cause of good, and of good only, but it may become, through the perverse passions of men, the occasion of extensive and prolonged evils, such as we have just seen. The cause—the true and real cause—of persecutions is not to be found in the Gospel, but in the depravity of human nature. Indeed,

> "Scarcely an ill to human life belongs,
> But what our follies *cause*, or mutual wrongs."

Vast and dreadful as the evils of persecution have been, the overruling providence and unfailing grace of

God have pressed them into his own service, and rendered them the means of promoting the very cause they sought to destroy. These storms, which the ambition and pride of the wicked raised among men, he permitted with the same intention as tempests among the elements, namely, to scatter noxious vapors and to preserve the moral atmosphere in a healthy condition. In the Divine Government, persecutors occupy the same station as whirlwinds or hurricanes. When they prevail, and wield the power they have gained with an oppressive and cruel hand, they are in truth no more than his instruments for the good of his people, and for the ultimate welfare of his church.

In the hand of God, persecutions are rendered the means of improving and signalizing the graces of his people, and thereby of raising them to higher honor and glory. In passing through the furnace, their souls are tried, refined, and brightened. In fighting the battle they are fitting for the crown. It was thus that those illustrious bands of confessors and martyrs of old were elevated and set forth to the admiration of all ages to come. How many shining examples of fortitude, constancy and patience would have been lost to the world had religion met with no opposition, no trials, and all things had proceeded in one undisturbed calm!

Under the government of Heaven, persecutions are made conducive to the advancement of truth, and the propagation of religion in the world. Paul, referring to certain sore trials through which he had passed, says, "I would ye should understand, brethren, that the things which happened unto me have fallen out rather unto the furtherance of the Gospel; so that my bonds in Christ are manifest in all the palace, and in all other places." In those ages when the church was most exposed to fiery

trials, it flourished the most. When the four winds of heaven blew against it, they served only to make it shine the brighter and flame the higher. The constancy and fortitude of those who suffered and died for the truth had a much greater effect in increasing the numbers of converts than all the terror and cruelty of persecutors in diminishing them. The blood of the martyrs became, in the soil which it moistened, the seed of faith, devotion, and love.

## ANALOGY V.

*As the Sun of Nature, by the simple power of his warm beams, overcomes all the rigor and resistance of winter to clothe the earth with the verdure and fruits of summer—so the Sun of Righteousness, by the gentle power of his love, is to overcome all the hatred and opposition of enemies, and overspread the world with the saving truth and peaceable fruits of his Gospel.*

### PHENOMENA.

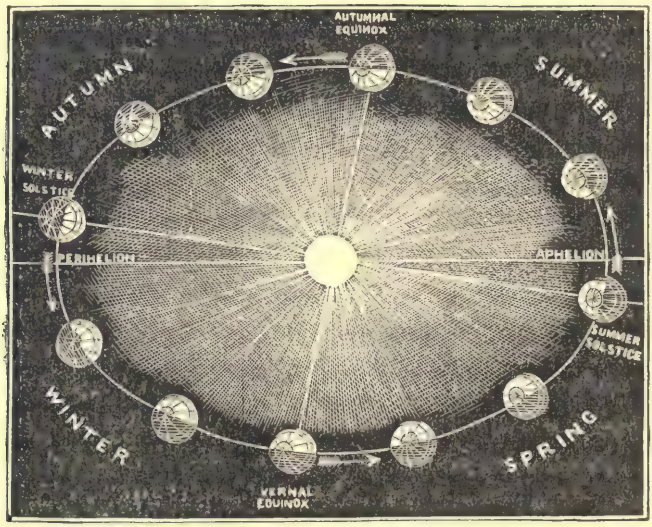
THOSE who have performed voyages in balloons tell us that, under the influence of a steady wind, while they close their eyes or do not look down to the earth, their sensation is that of perfect rest; they are not sensible of the slightest motion, though they may be travelling at railroad speed. And in the cabin of a large and heavy ship, going smoothly before the breeze in still water, we perceive not the least indication that we are advancing, though we may be making ten or twelve knots an hour. We sit or walk, read or write, as if we were on the solid land. If we throw a ball into the air, it falls back into our hand; or if we drop it, it falls at our feet, just as if we were on shore; and this for the reason that all things around us are moving along with us. There is nothing in view to mark or indicate that we are progressing. So it is

with us all as passengers on this earthly ball, which, as a vast aerial ship, is sailing steadily through the voids of space; we are not conscious in the faintest degree of its motion, though it is sweeping onward with a fearful velocity, for there is nothing around us to mark its advance, the mountains and oceans and atmosphere being carried along at the same speed.

The Great Architect of the universe has appointed the earth to revolve around the Sun in the period of one year. Its orbit is an ellipse, but one that does not greatly differ from a circle. In this it moves at the mean distance of 92,000,000 of miles, and at the rate of 68,000 miles per hour. The Sun is situated, not in the centre of this ellipse, but a little one side of it, or in what mathematicians call one of its foci. From this it necessarily results that the distance of the earth from the Sun at its perihelion, or nearest point, is considerably less than at its aphelion, or farthest point. This fact would naturally suggest that the period of nearness must be that of Summer, and that of distance Winter; but strange as it may seem, the very reverse is the case. On the 1st of January the earth is about *three millions* of miles nearer to the Sun than on the 1st of July.

It is obvious, therefore, that the cold of Winter and the heat of Summer must depend upon some other cause than that of distance. That cause is found in the inclination of the earth's axis to the plane of its orbit; that is, its axis leans from a perpendicular to that plane by an angle of 23½ degrees. The effect of this arrangement is to overbalance that of nearness or remoteness, by presenting the northern hemisphere of the globe when at its greater distance more directly towards the Sun, and its southern hemisphere at its lesser distance more obliquely. To this simple arrangement we owe all the changes of our

seasons, and all the variation in the length of our days and nights through the year. A glance at the annexed Figure will make this plain to every reader. At the vernal equinox, it will be observed, that the Sun illumines the globe exactly from pole to pole. As the earth advances, this illumination passes beyond the North pole, and falls as much short of reaching the South pole, until it has arrived at the Summer solstice, when its rays reach the arctic circle, or 23½ degrees beyond the North pole,




POSITION OF THE EARTH AT DIFFERENT SEASONS.

while at the same time they fall short by the same distance of reaching the South pole. *Now* the changes are reversed, and go on thus until they arrive at the Winter solstice, when the sunlight passes beyond the South pole to the antarctic circle. From this point it begins to return after the same manner till it reaches again the vernal equinox, the point from which we started.

All this, perhaps, may be made plainer still by placing a small low lamp in the centre of a round table to repre-

sent the Sun, and taking a ball of white worsted to represent the earth, with a knitting needle thrust through the centre to indicate its axis. Now let this ball be glided along the edge of the table as an orbit, keeping the needle inclined and pointing exactly in the same direction all along, and the light falling on the ball in its progress will indicate very plainly the changing round of the seasons.

In the hemisphere which is inclined towards the Sun, then, there is Summer; while in that which is inclined away from it, there is Winter. In our zone or latitude, the Sun, at noon, is 47° lower at the Winter solstice than it is at the same hour at the Summer solstice; that is to say, its rays fall upon us by so many degrees more obliquely, and therefore more feebly. Meanwhile it is absent altogether during the night for nearly twice the number of hours that it shines. The consequence of all this is the cold weather of the winter season. And how great this cold often is, and what desolation it spreads over the face of nature, every reader well knows. Look abroad at what hour or in what direction we may, and, as compared with the scenes of summer, how chill and dreary the view! No verdure, no foliage, no grazing flock, no peeping flower is to be seen; no hum of insect or song of bird relieves the all-pervading stillness. The Sun's beams, coming from the low verge of heaven, are so weak and wan as scarcely to be felt. The atmosphere, laden with frozen vapors, is raw and chilling. Vale and hill are clothed with glittering snows. The soil is hardened to a rock. The streams and lakes are bound in icy fetters. The glaciers are extending their long cold arms far into the plains. Every tree, like a fleshless skeleton, is stretching out its bare brown boughs, and the wind, cold and piercing, moaning through them as

in funeral dirges. All nature wears one sullen aspect, bleak and desolate, to eye and ear and feeling, comfortless alike.

Such is the face of the earth around us at this season. And is it evermore thus to be? Will nature forever lie thus entombed in ice and snow?—But for our recollection and experience of the past, how hopeless it would appear that such a scene would ever give place to one of sunny days, balmy air, and luxuriant vegetation. Yet all this will come—slowly but surely come. The Sun will rise higher and higher, his rays will acquire greater strength, and beneath their gentle influence the snows will melt away, the ice will relax its grasp on the waters, the earth will soften and open its bosom, the roots of grass and trees will feel the genial warmth, vegetation throughout her realms will resume its life and verdure, flowers will bloom and birds will sing, and all nature will be again enrobed in the charms and glories of the summer. What a change, what an enchanting miracle is thus annually wrought for our world! And all this by the gentle power of the Sun's beams, falling without producing a jar or a sound in effecting all the work.

"What scenes of delight, what sweet visions he brings,
Of freshness, of gladness and mirth—
Of fair sunny glades where the buttercup springs,
Of cool, gushing fountains, of rose-tinted wings,
Of birds, bees and blossoms, all beautiful things,
Whose brightness rejoices the earth!"

## Teachings.

Wonderful, indeed, is the change effected in the material world in passing from Winter to Summer, but more wonderful far is the change destined to be accomplished in the moral world through the benign influence of the Sun of Righteousness. If a native of some tropical

island, where it is balmy summer all the year round, who had never heard or known anything of countries that have such a round of varying seasons as we experience, should be conveyed in a close cabin and landed suddenly amid our cold and ice and snow-drifts, where all seemed dead, not a leaf remaining on the trees, nor a blade of grass to be seen peeping out of the ground—if such an individual should be told that within five or six months all this would be completely changed, and the whole face of the country present a scene of living luxuriance and beauty similar to that of his native isle, he would doubtless deem it a thing incredible, for it would appear to him to require nothing less than a miracle to bring about such a transformation. So, if an inhabitant of some sinless and happy world, where all are holy, harmless, and undefiled, had been dropped upon our globe in the infancy of Christianity, the moral winter of the world, and had gone up and down among its fallen and sinful populations, and witnessed their cruel wars and tyrannies, their foul and corrupting idolatries, their social vices and secret pollutions, their utter alienation from God, and universal corruption through sin—if such a being had been told that a remedy, an efficient remedy had been provided whereby this apostate race should be recovered, and restored to virtue and holiness; that the whole earth would yet be covered with the knowledge and love of God, even as the waters cover the deep, he would have stood amazed at the statement, he would have incredulously exclaimed like Nicodemus, How can these things be? And yet, so it is to be, for the mouth of the Lord hath spoken it. As the Sun of nature, by the simple power of his warm beams, overcomes all the rigor and resistance of winter to clothe the earth with the verdure and fruits of Summer; so *the Sun of Righteousness is*

*destined, by the gentle power of his love, to overcome all the hatred and opposition of enemies, and to overspread the world with the saving truths and peaceable fruits of his Gospel.*

The only means which the world employed or knew for subduing rebels or vanquishing enemies was force, violence, punishment. But for this end Jesus Christ chose and introduced a *new power.* The moving, subduing and transforming element of influence He employed, and still employs, to win the confidence and secure the obedience of revolted humanity is, not threats nor terrors nor vengeance, but LOVE—the Love of the Father, the Love of his own pitying and compassionate heart. The proclamation with which he entered our rebellious world was, "God so loved the world that he gave his only begotten Son, that whosoever believeth in him should not perish, but have everlasting life." In him, in his life and in his death, the world beholds the Love of God as it beholds it in nothing else, and as it is expressed through no other medium. The Love of God in Christ, as displayed upon the cross, is the mighty force, the spiritual magnet, which is to draw all men unto him. It is the doctrine of crucified Love that is to triumph over man, that is to be effectual through grace to arrest, to captivate, and to regenerate human hearts. Where the cross is wanting, all preaching, though by tongues of fire or of angels, has neither power nor efficacy for this end. But wherever *this* is lifted up, though with feeble hands and faltering lips, it proves a resistless power. The cross is the most expressive symbol of the unfathomable Love of God, and the instrument of most effectual energy for the recovery of man. In the cross, mankind behold God pitying and loving his creatures, and adopting a method inexpressibly grand and affecting for remedying that evil

which is their disgrace and their perdition. Through the cross they apprehend what, in its deep meaning, they never had apprehended before—*incarnate, crucified, dying* LOVE! This lifted up before the sinner, suddenly he feels its power, and gains a glimpse of its Divine mystery, the mystery of godliness—God in Christ reconciling the world unto himself—God in an attitude of amazing tenderness and pity, winning back his erring creatures to himself! Now the wondrous sight, and the more wondrous truths of which it is the symbol, take entire and permanent possession of his whole being, and henceforth he goes on his way through the world exclaiming, "God forbid that I should glory save in the cross of our Lord Jesus Christ!"—O yes, this is the power by which the Sun of Righteousness warms and melts the icy hearts of the children of men, and is carrying forward the world from its winter of sin and sorrow to the summer of holiness and joy—LOVE, *crucified* LOVE!

This was the power that softened and subdued the hard hearts of publicans and sinners. This was the power which overcame the superstition, perverseness and enmity of man, wherever Apostles or disciples proclaimed the sweet story of Redeeming Love, whether among barbarians, Scythians, bond, or free. And this was the power which relaxed, and ultimately dissolved the bonds of the great system of ancient idolatry, so that the whole vast fabric fell to pieces, and the banner of the cross was erected upon its ruins.

These achievements of the Gospel, in the ages gone by, are a promise and a pledge of its progress and triumph in time to come; for no difficulties more formidable can arise in the future than those which it has overcome in the past. What more powerful opposition or more furious enmity can be conceived than those which beset Christi-

anity in its early days. All the learning, logic, wisdom, and philosophy which the world possessed were arrayed against it; nor only that, to oppose its progress, power, also, lifted up its arm—authority promulgated its edicts—bigotry mustered its hosts—intolerance pointed its enmity—persecutions opened its dungeons, forged its fetters, reared its gibbets, and kindled its fires; but in the face of all this, it went on conquering and to conquer. But what the Gospel was it still is, "the power of God." It is still extending its influence and multiplying its trophies. Slowly but surely it is advancing to the sovereignty of the world. Its enemies are as powerless to stay its progress as they are to arrest the revolution of the seasons. As the ice melts away from the waters, as the snow disappears from the fields, and as the frost vanishes from the atmosphere, before the returning Sun of spring; so before the warm and illuminating beams of the Sun of Righteousness, all unbelief and hardness of heart, all the sophistry of the infidel, all the errors of the Mohammedan, all the delusions of the Brahmin and Budhist, all the superstition and cruelty of the idolater, shall ultimately melt away and vanish from the face of the earth. The idol and the altar of the pagan shall perish together. Juggernaut shall bow before the cross. The Shasters and the Koran shall shrivel and vanish in the presence of the Gospel. The habitations of cruelty shall become the abodes of holiness and peace. And the Mosque and the Pagoda shall be transformed into temples for the worship of the true and living God.

Visions of glory! Bright anticipations of the future! Shall they ever be realized? They shall, they must; and these are our vouchers: "The kingdoms of this world shall become the kingdom of our Lord, and of his Christ."—"All the ends of the earth shall remember and

turn to the Lord; and all the kindreds of the nations shall worship before him."—"From the rising of the Sun, even unto the going down of the same, my name shall be great among the Gentiles; and in every place shall incense be offered unto my name, and a pure offering; for my name shall be great among the heathen, saith the Lord of hosts."—"And the dominion, and the greatness of the kingdom under the whole heaven, shall be given to the people of the saints of the Most High; and all dominions shall serve and obey him."—"His way shall be known upon earth, and his saving health among all nations."—"He shall have dominion from sea to sea, and from the river unto the ends of the earth."—"All the ends of the earth shall see the salvation of our God."—"And the glory of the Lord shall be revealed, and all flesh shall see it together, for the mouth of the Lord hath spoken it."

## ANALOGY VI.

*As the Sun of Nature, by its warm beams, draws upward the vapor from sea and land, to be condensed, and presently returned in refreshing showers on the heated plains and thirsty fields,—so the Sun of Righteousness, warming the hearts of his people, draws forth their prayers and supplications, to return, in due time, in gracious effusions upon their own souls and upon those of others.*

### PHENOMENA.

THREE thousand years ago, a devout observer of the system of nature affirmed that, "The heavens declare the glory of God, and the firmament showeth his handiwork." Modern science has abundantly confirmed and illustrated the truth of this statement, by revealing to us in that "firmament," or atmosphere, a combination

of processes carried on, which none but Infinite Wisdom could have contrived, and none but Infinite Power put in operation. *There* science shows us the three mighty agencies of nature—heat, air and water—in incessant activity, and playing into each other's hands with the regularity and efficiency of instinct, and laboring together with what might be almost called intelligence, to refresh and vivify the earth, to support and nourish life, and to distribute countless blessings over all the world, by giving us both the early and the latter rain.

Rain is indispensable to the welfare of the world in which we dwell; indispensable, indeed, to constitute it a habitation for any organized existences, at least, any such as we are acquainted with. Without rain there could be no vegetation, without vegetation there could be no animals, and without vegetation and animals there could be no men to occupy the face of the earth. A rainless world would be a tenantless and lifeless world.

The first step in the process of rain-production, as observed in a former chapter, is *evaporation*, a most interesting and wonderful operation. Let us glance at the leading particulars it involves. The atmosphere, as composed of oxygen and hydrogen, together with a small proportion of carbonic acid, is so constituted as to be capable of absorbing moisture and retaining it in an invisible state; the warmer the air the greater is its capacity for this. The air in a room measuring 100 feet each way, and at a temperature of 68° Fahr., is capable of taking up and holding upwards of half a ton of water. Again, water is so constituted that, under the influence of solar heat, it is susceptible of being converted into invisible vapor or steam. In this state it occupies a space 1,600 times greater than in its liquid state, and is therefore much lighter than air; consequently it readily floats

in it, and ascends into its higher regions, till it reaches an altitude where its weight and that of the rarefied air around it are equal. In this way vast quantities of water, in the form of invisible vapor, are continually ascending from sea and land.

Now, this process of evaporation is carried on so gently and so silently, that, at first thought, it would appear to require but little power to effect it; but in reality the force expended is absolutely stupendous. It has been calculated that the amount of heat required to evaporate a quantity of water which would cover a district of ten miles square to a depth of one inch, would be equal to the heat which would be produced by the combustion of 500,000 tons of coal. And the amount of force of which this consumption of heat would be the equivalent, corresponds to that which would be required to raise a weight of upward of 1,000,000,000 tons to a height of one mile. Now, when we remember that the area of the State of New York alone is 47,000 square miles, and that the average annual rain-fall is 37 inches, we see that the force expended to secure for us one year's rain is truly enormous. All the coal which could be raised from all the mines of the United States in a thousand years would not give out heat enough to produce an adequate supply of rain for a single year, for that one State.

The second step in the production of rain is the *condensation* of this invisible vapor. This is effected by the cooling of the air below the temperature of the dew-point. From observations made in balloons and on high mountains, it has been found that the temperature of the atmosphere lowers as we ascend; at an altitude of two miles it sinks about 35° Fahr. Now the vapor produced by the solar heat from the surface of the land and water is carried upward with the warm air which has absorbed it,

and having reached those higher and cooler elevations, it condenses, and becomes visible in the form of thin, diffused mist. This is sometimes seen to float at so great a height as four, or five, or even six miles.

The third step in the process is the breaking up and collecting of this diffused mist into *separate and distinct clouds.* How this is accomplished is not very clearly understood, but it is an arrangement worthy of all admiration. If the condensed vapors were left to overspread and obscure the whole heaven, how monotonous would be the aspect of the skies above and the earth below!—we should be always living under one dull, gray canopy of mist. But instead of this, Infinite Wisdom has so adjusted the working together of the elements here, as in a thousand other things, as to minister both to our pleasure and to our necessities. Now, while clouds prevail, our eyes are delighted, here and there, with the blue ethereal sky, and with the pleasing alternations of shade and sunshine. To repeat what I have elsewhere said on this subject, "how charming the lights and shadows that are thus made to flit over the face of the landscape; now we see the Sun suddenly bursting forth from his hiding-place, and flooding all nature with his genial heat and glories; and now we witness the deep, gigantic shadows of the flying clouds, careering one after another, over field and forest and mountain-side! Add to all this, the endless combinations and shades and forms the clouds are made to assume, in order to relieve and adorn our skies. We have the delicate tints that first streak the morning sky, spreading and deepening, spreading and deepening, till the whole roof above is wreathed and lined with purple glories. Then we have the silky vapors that, at the fervid noon, float in the highest azure, as if the altar smoke of pure devotion on its way before the Highest."

The vapors having been condensed and formed into clouds, a fourth agency comes into beautiful play for their *transportation* to the various regions where their enriching contents are needed. This is accomplished by the numerous air-currents, or winds, which traverse the atmosphere. These take the clouds, as it were, in tow, and convey them in various directions over the face of the whole earth. Though these winds, excepting the Trades and Monsoons, appear to observe no law or order, either as to their times or directions or velocities, and *seem* to well deserve the epithet "fickle," so often applied to them, yet so admirably, as a whole, are they adjusted, that they rarely neglect a district or a spot, or fail to float over it the cloudy cisterns that are to distill upon it the needed moisture in its season.

With this we are brought to notice a fifth process in the arrangement made for watering the earth, and one equally interesting and wonderful, namely, the *release* of the waters from the clouds. The clouds we know float along through the atmosphere, often for hundreds of miles, retaining their whole cargoes of water without losing a drop. By what means, or through what influence, then, are they at length compelled to discharge and shower down their contents? It is by a process the reverse of that which at the first lifted them from the earth into the skies. "As water is converted into vapor by heat, so by the loss of heat vapor is reconverted into water. Hence, when a cloud of vapor, either by entering a chillier stratum of air, or by coming in contact with colder currents, loses any portion of its former heat, a corresponding proportion of its aqueous contents is condensed into what may be called *water-dust.* And these dust-like particles, by coming into contact, unite; and these again, in a similar manner, coalesce with others still, till visible globules or

drops are formed. And all this process is conducted with the exactness of number, weight and measure. A cloud, for example, floats in a current of air of 80° temperature; if that current loses 9° of its heat, the cloud must cast overboard, in the form of a shower, one-quarter of its load; and if it loses 21° of its heat, then it must part with one-half of its tonnage. Thus as the heat gradually decreases, the condensation of the vapor gradually increases, forming the drops and the showers, which refresh and renew the face of the earth."

One more feature of these marvellous arrangements of the firmament remains to be noticed, and that is, "*The manner in which the clouds discharge their contents*, namely, in *soft and gentle showers.* If, instead of this, they poured out their prodigious cargoes at once, in streams and floods, the consequences, frequently, would be destructive and lamentable in the extreme, as is evident from instances of this kind, which, at distant intervals, have taken place. Vegetation would be destroyed, crops would be beaten into the ground, the trees stripped of their leaves and fruits, the fields ploughed into trenches, and the soil washed away, the streams suddenly swelled into impetuous and destructive torrents; so that presently every gathering or passing cloud would become, like an avalanche, an object of terror to all who beheld it. Viewed in contrast with all this, how beautiful, how beneficent is the existing arrangement! Instead of descending like this, in ruinous cascades, we see the water trickling down in gentle and fertilizing drops, as if the nether sides of the clouds were finely perforated into a sieve, and these drops alighting upon the earth without bruising a flower or destroying a blade of grass. Softly the work begins, and softly it is carried on as the cloudy cisterns sail slowly over field and forest, hill and dale, leaving no district

unvisited, no spot unwatered. Who that intelligently contemplates all this, but must be rapt into admiration and gratitude, in view of the designing wisdom and diffusive goodness of God, as seen in every passing shower!"* —"Thou, O Lord, visitest the earth, and waterest it: Thou waterest the ridges thereof abundantly: Thou settlest the furrows thereof: Thou makest it soft with showers: Thou blessest the springing thereof: Thou crownest the year with thy goodness; and thy paths drop fatness. They drop upon the pastures of the wilderness; and the little hills rejoice on every side. The pastures are clothed with flocks; the valleys also are covered over with corn; they shout for joy, they also sing;" Psalm lxv. 9–13.

## Teachings.

Under the beautiful imagery of the above Psalm—namely, that of timely and copious showers refreshing a dry and thirsty land; descending upon the open furrows and softening and dissolving them to nourish the seed, and cover the valleys over with corn; dropping even on the desolate wilderness and clothing it with pasture and with flocks; and thus filling the hearts of all with joy and gladness—under these pleasing images may be represented to us the quickening, invigorating, and fructifying grace shed down from on high upon the dry and barren spirits of the children of men, in answer to prayer. As the Sun of nature, by its warm beams, draws upward the vapors from sea and land, to be condensed, and presently, to be thus returned in refreshing showers on the heated plains and thirsty fields; *so the Sun of Righteousness, warming the hearts of his people, draws forth their prayers and supplications, to return, in due time, in*

* The passages marked as quotations, in the above paragraphs, are taken from the Author's work, entitled, *Science and the Bible*, pp. 115–122.

*gracious effusions upon their own souls and those of others.*

As all the evaporations, which are ultimately to descend in fertilizing rain, are generated and drawn upwards by the power of the Sun's rays; so all true prayers are called forth under the gracious influences of the Sun of Righteousness. Apart from him there is, there can be, no true and effectual prayer. It is his light, his truth, that reveals to men their spiritual destitution and need of prayer, that *they are wretched, and miserable, and poor, and blind, and naked.* It is his Spirit that quickens them to realize this, and disposes and teaches them to pray for relief; *He helpeth our infirmity, for we know not what we should pray for as we ought.* It is the warm beams of his dying love that attract them to the throne of grace; *No man cometh to the Father except he draw him.* And it is through his mediation that our prayers are heard and answered; *He maketh intercession for the saints according to the will of God, so that whatsoever they ask in his name, he will do it.* He is our advocate with the Father. Through him we have access to the mercy-seat. Our petitions are received by him into his golden censer, and, mingled with the ascending incense of his merits, are offered before the throne of God. Our voice, ere it reaches the ear of Jehovah, falls in and blends with his voice, and *him we know, the Father heareth always.* Thus prayer owes its origin, its exercise, and its efficacy to the gracious influence of the adorable Saviour of men.

Again: As all the vapors which the Sun draws upward to the skies are sure, sooner or later, to descend in showers to benefit the earth; so all the prayers drawn from the heart by the warm and quickening beams of the Sun of Righteousness are sure to return, in their

time, in blessings upon those who offer them. No prayer is offered in vain. In the system of the firmament, we have seen, that there is a natural and necessary connection between the rising vapors and the descending showers; so in the system of grace, there is a real and unfailing connection between prayer and the blessing of God. *Every one that asketh receiveth.* Prayer, true prayer, infallibly gains the ear and receives the blessing of God. Such a prayer cannot be offered without benefit to the soul. Every prayer, indeed, may not be answered in the way, or at the time, or by the means the offerer may look for or desire, for that may not be best for him; but answered it shall assuredly be. For this we have the promise and pledge of him whose word cannot be broken: *Verily, verily, I say unto you, Whatsoever ye shall ask the Father in my name, he will give it you. He that spared not his own Son, but delivered him up for us all, how shall he not with him also freely give us all things.*

Again: As the greater the amount of vapors that go up from the earth, the greater the amount of rain that will presently come down upon it; so the more abundant the prayers and supplications that ascend to the throne of grace, the more abundant will be the blessings that will descend thence in return. Prayer will ever be in proportion to our faith, and according to our faith it is to be unto us. The most prayerful are to be the most blessed, the most spiritual, and the most happy. Hence the earnest and uniform exhortations of scripture: "Men ought always to pray, and not to faint;" "Pray without ceasing;" "Continuing instant in prayer;" "Praying always with all prayer and supplication in the Spirit;" "In everything by prayer and supplication with thanksgiving let your requests be made known to God." Hence in every age, and in every land, they who have abounded

most in prayer have abounded most in all spiritual gifts and graces. Witness the most eminent saints of all history. *David*, speaking of his devotional habit, says, "Evening, and morning, and at noon, he shall hear my voice." *Daniel* "kneeled upon his knees three times a day, and prayed and gave thanks." *Cornelius*, a devout man, "prayed to God always." Paul "prayed night and day exceedingly." *Luther* and *Melancthon* were men "who gave themselves to prayer daily." *Baxter* is said to have "stained his study walls with the breath of prayer." *Doddridge* tells us that his "whole dependence for success both in study and preaching was on prayer." *Boerhaave* spent an hour every morning in prayer and meditation. *Wesley* and *Whitefield* were as stated in secret prayer as they were in feeding their bodies with necessary food. *Henry Martyn* says, "In prayer I have the most precious views of Christ; I want no other happiness, no other sort of heaven." *Brainard* and *Payson*, *Judson* and *Finney*, express themselves in similar language. Hence the power and usefulness of all these great and good men among their fellow-creatures. When they came forth from their interviews and communion with God, their countenances seemed to shine with the glory, and their garments to be filled with the perfume, of the upper sanctuary. Truly hath our Poet said,

> 'When one, that holds communion with the skies,
> Has filled his urn where these pure waters rise,
> And once more mingles with us, meaner things,
> 'Tis e'en as if an angel shook his wings:
> Immortal fragrance fills the circuit wide,
> That tells us whence his treasures are supplied."

What is thus true of the efficacy of abounding prayer in bringing down the richest blessings of heaven upon the individual soul is equally true in reference to the

church at large. If a congregation, or a community, or a nation, seek the Lord with the whole heart, he will be found of them. Prayer has ever preceded the out-pourings of God's Holy Spirit. God will be inquired of by the house of Israel to do for them this thing. Of this the best proofs are facts. This was eminently the case of the National Reformation under Josiah, when the whole aspect of the church was changed, and the leaven of piety diffused through the entire mass of the people. The same was true of the surprising change effected by the ministry of Ezra. So of the great revival at Jerusalem in the days of the apostles; after the Saviour had been taken up from them, and a cloud had received him out of their sight, "they returned to Jerusalem from the mount called Olivet, and when they were come in, they went up into an upper room, where abode both Peter and James and John, and the rest of the apostles; these all continued with one accord in prayer and supplication, with the women, Mary the mother of Jesus, and with his brethren." And while thus unitedly breathing out prayer, the Spirit of God descended and filled the place where they were assembled. A little later, we read that in answer to the prayer of the company with whom Peter and John met, "the place was shaken where they were met, and they were all filled with the Holy Ghost, and spake the word of God with boldness." Leaving scripture history, and coming down to later ages, I may add that the great Reformation of Germany, in the sixteenth century, was preceded by prayers and supplications the most earnest on the part of God's faithful ones; and it was with strong crying and tears that the great work was carried on. D'Aubigne, the distinguished historian of that period, having related the wrestling and agonizing prayer of Luther before entering the Diet

of Worms, adds, "This prayer discloses to us Luther and the Reformation. History here lifts the veil of the sanctuary, and discovers the secret source whence strength and courage descended to the humble and despised man, who was God's instrument, to set at liberty the soul and thought of man, and open a new age. Luther and the Reformation lie open before us. We discern their inmost springs. We see where their power lay."* In no recorded case of modern times, perhaps, has the converting power of the Spirit been more signally displayed than under the preaching of John Livingston, in Scotland, in 1630. To name but one instance—that good man with a company of his brethren, spent a whole night in prayer for God's blessing; and the next day, under his sermon, no less than five hundred souls were converted. Richard Baxter ascribes the extraordinary success which attended his preaching at Kidderminster to the abounding prayers of the people: "They thirsted for the salvation of their neighbors. Abundance of them prayed in their families. Once a week the younger sort met and spent three hours in prayer together. Every Saturday night the people assembled to pray and prepare themselves for the following day." The great element of power which attended the ministry of John Wesley, his biographer tells us, was the frequent meetings for prayer, which he everywhere appointed among his followers. President Edwards, in his account of the great revival in New England, about the year 1740, says, "The inhabitants of many of our towns are now divided into particular praying societies; most of the people, old and young, have voluntarily associated themselves in distinct companies, for social worship in private houses." Dr. Payson, of Portland, whose preaching was

* See *History of the Great Reformation*, vol. ii., p. 224.

signally blessed during his whole ministry, ascribed his success to the united prayers of his church, which was divided into seven districts for this purpose. And Finney, whose preaching and writings shook the half of America, and sent a wave through the British churches, placed his whole dependence upon answer to prayers: in the midst of his most glorious work he says, "Prayer-meetings have been numerous and frequent in most of the churches; and never have our churches generally appeared to entertain so delightful and exalted ideas of God as the hearer of prayer." From all these facts, together with the express declarations of Scripture, we are warranted to conclude that there is an established connection between prayer and the bestowment of the gifts of the Spirit, and that the more abundant those exhaltations of the heart, prayer and praise, the more abundant will be the blessings showered down from heaven upon the souls of men.

Once more: As without the ascending vapors, collecting and descending in showers, the earth would soon become parched, and barren, and dead; so without the rain and dew of Divine Grace, given in answer to prayer, the moral world would become as iron, and its heavens as brass; every plant of holiness, every flower of piety, and every blade of virtue, would soon droop and die. Prayer is the life-breath of all true religion.

Let prayer, therefore, daily ascend as the vapors from the ends of the earth, and rise as clouds of incense before the Throne, and this wilderness world shall yet blossom as the rose, and flourish as the garden of the Lord.

## ANALOGY VII.

*As the warm rays of the Sun, while they are stimulating and strengthening the plants and flowers of the field through the hours of the day, are at the same time preparing the dews that are to refresh them through the watches of the night;—so the Holy Spirit of the Sun of Righteousness, while he is quickening and instructing his people in their brighter days, is at the same time fostering the graces that are to cheer and sustain them in the darker seasons of age and adversity.*

### Phenomena.

When at the close of a fervid summer's day, the Sun has withdrawn from view, and from the dark blue vault of heaven the glittering constellations shed down their serene light upon the earth, the leaves of the forest, the grass of the meadow, and the flowers of the garden become moist with a fluid of the most translucent nature, and which presently flows together into minute globules, pure and lustrous as orient pearls;—these are the *dew-drops*—phenomena which have ever delighted the eyes and refreshed the spirits of the good and thoughtful. It is not surprising that the ancients, in their ignorance of nature's operations, should have thought that the dews were actually shed from the stars, or that the philosophers of the Dark Ages should have conceived that this pure distillation of the heavens possessed subtile and penetrating powers beyond all earthly fluids, or that the proud dames of those olden times should have endeavored to preserve their charms by stated ablutions in so pure a liquid. Ammianus Marcellinus ascribed the health and longevity of mountaineers to their exposure to the dews of night. The alchemists of the sixteenth and seventeenth centuries employed it, as an agent of superior efficacy in their experiments on the solution of gold. And the ladies of those periods collected this "celestial wash"

by exposing fleeces to the influence of night, imagining that it possessed the virtue of preserving both their features and complexion from the ravages of advancing age. But the investigations and experiments of modern science have lifted the veil of mystery which the ignorance and superstition of former ages had cast over this interesting product of nature, and revealed its true origin and character.

The earth owes its Dew, no less than its rain, to the agency of the Sun. The Sun, as we have had repeated occasions to observe, is the mainspring of the world's life and activity. From him proceed the forces that work out nearly all the changes and productions observed in nature. All life, plantal as well as animal, is wholly dependent upon his unceasing ministries. His rays are indispensable to the growth and fruitfulness of all vegetation. It is under his genial influence that the germ lying in the bosom of the buried seed is first quickened into vital activity, and sends forth its tender shoot. And when that shoot has grown into a bush or tree, it is from his stimulus that its leaves derive their power to breathe; that is, to give out the oxygen which it does not need, and to absorb the moisture and carbonic acid and ammonia from the atmosphere necessary to build up the woody substances of which it consists. The leaves, which are truly the lungs of plants, can only perform these important functions so long as they are stimulated by the light of the Sun. Add to all this, that to the influence of the Sun all the various species of vegetation owe their peculiarities of taste, smell, color, and other properties. In short, their life, their health, their growth, their beauty, and their usefulness are all due to those ethereal forces which daily visit them in the solar beams. The mysterious powers of the Sun are unremittingly at

work, from morning till evening, in fostering, rearing, and maturing every tree, and shrub, and plant and flower and blade of grass that springs out of the ground.

While the Sun is doing all this for the vegetation of our globe during the day, he is at the same time preparing means to refresh them, while absent, through the watches of the night. His warm rays, through all the hours of his shining, are drawing up from sea and land and lake, vast quantities of water, in the form of invisible steam, and thus loading the atmosphere with aqueous vapor; much of this, as stated in the preceding chapter, ascends into the higher regions of the atmosphere, and is there condensed into clouds, and, in due time, returns in the form of showers; much also remains suspended in the air near the earth's surface, part of which, during the night, is condensed and forms the moisture we call Dew. This condensation takes place in consequence of the earth's radiation of its heat into space. The Sun, as we have seen, pours a perpetual flood of heat upon the earth, and thus warms the soil and all else upon its surface. This heat is continually radiated, or thrown back into the air. During the day, however, the earth's surface receives from the Sun more heat than it throws out, and its temperature is thus kept up, and there is no dew. But in the night, as no heat is received, its surface is soon reduced to a temperature lower than that of the overlying air. And, as the vegetation and other substances spread over the soil become colder than the atmosphere, they acquire the power of condensing the vapor, with which the air is always more or less charged, and thus form dew, on the same principle and in the same manner as the moisture formed on the outside of a tumbler filled with ice-water on a warm summer's day—that moisture is dew.

The amount of dew deposited on any particular substance is proportional to the depression of its temperature below the dew-point; the greatest quantity of dew being found upon those whose temperature is lowest. According to careful and extended observations made in England, it was found that a thermometer placed on the grass, fully exposed to the sky, after sunset, frequently sank 10° Fahr., and sometimes 15°, below a thermometer suspended four feet from the ground; hence the copiousness of the dew usually found on the grass.

The slowness or rapidity with which different bodies radiate the heat they receive from the Sun depends both on their *color* and *contexture;* and as substances thus possess dissimilar radiating powers, so they accumulate dew in different degrees. Rough and porous surfaces radiate heat more rapidly than smooth and dense ones; and, if exposed, are sooner covered with dew. The grass-plot glistens with dew, whilst the hard and stony walk is unmoistened. So clear, colorless glass is very readily suffused with dampness; but polished metals are not so, even when dews are heavily condensed on other bodies.

By numerous experiments made by means of delicate thermometers, it has been found that "every tree spreading its green leaves to the sunshine, or exposing its brown branches to the air—every flower which lends its beauty to the earth—possess different absorbing and radiating powers. The chalice-like cup of the pure white lily floating on the lake—the variegated tulip—the brilliant anemone—the delicate rose—and the intensely colored peony or dahlia—have each powers peculiar to themselves for drinking in the warm life-stream of the Sun, and for radiating it back again to the thirsting atmosphere." In this way plants and flowers, though growing from the same soil and beneath the same sunshine, are

prevented forever from having the same temperature. Each plant is so constituted as to measure and regulate for itself the degree of heat best suited for its well-being; and is thus endued with functions which silently determine the relative amount of dew which shall wet its colored leaves. How wonderful is all this! If the form and coloring of a flower excite our admiration, surely, when we contemplate such an arrangement, our admiration must be carried upward to the higher feeling of devout astonishment at the perfection of the works of the great Designer of all.

From this we are naturally led to notice the prevailing color given to the earth's surface—*Green.* This is not only a lively and beautiful color, and the softest and most agreeable to the exquisite sensibility of the eye, but also highly favorable to radiation. Green substances are among the best radiators of heat, and are, therefore, the best qualified to condense the moisture of the surrounding air. Thus the grass and the leaves of plants and trees, which require a constant supply of moisture, being mostly of a green color, are admirably fitted to procure it.

In protracted seasons of warm weather, the heat of the Sun, unmitigated by any cloudy screen, draws upward vast quantities of vapors; and the hot day being succeeded by a calm, clear night, the radiation of heat into space is very rapid; the natural result is that, under such circumstances, the dew is most copious. Now, it is just at such a season, as is obvious, that dew is most necessary, in order to compensate for the lack of rain. On the other hand, in cloudy weather, when the solar heat is moderated, and showers are of frequent occurrence, dew is less necessary to vegetation; and it is precisely such weather that is least favorable to its formation. The clouds, like so many screens, intercept and radiate back

the heat transmitted from the earth, and thus prevent the temperature of the ground from sinking to the dew-point. Such is the beautiful balancing of the forces appointed to distill upon the earth its nightly dews.

The dew may be considered as a supplement to the rain. In certain parts of the world, and notably in Palestine, and Syria in general, but little rain falls from April to September; during this long period the vegetation is dependent for its moisture upon the dew. How admirable, then, the arrangement made, that the dew should be most copious at that season of the year when the supply of water from other sources fails; and not only that, but also that it should be provided in such abundant quantities. Professor H. B. Tristram, writing at Rasheiya, says, "We could here but recall the Psalmist's expression, 'As the dew of Hermon, and as the dew that descendeth on the mountains of Zion;' for more copious dew we never experienced. Everything was drenched with it, and the tents were small protection. The under sides of our macintosh sheets were in water, our guns were rusted, dew-drops were hanging everywhere."

How beneficent a provision, then, is the dew of heaven! It refreshes every thirsty plant, washes every delicate flower, and gives a new lustre to its finest tints. It cools and revives the whole face of nature. And how beautiful, too, is the dew on a calm summer's morning! As soon as the Sun's earliest beams shoot forth from the eastern horizon, its innumerable drops sparkle and play with the rainbow colors of light, and convert each lawn, each parterre, as into a garden of diamonds! With such a scene before him, who but must admire and adore that Divine Wisdom, which, by means the most simple, produces the most wonderful results, and which combines

and directs all the forces and elements of nature to the accomplishment of the most benevolent designs.

> "Thou art, O God, the life and light
> Of all this wondrous world we see;—
> Its glow by day, its smile by night,
> Are but reflections caught from thee!
> Where'er we turn, thy glories shine,
> And all things bright and fair are thine."

## Teachings.

Admirable as are the arrangements God has made to refresh, nourish and beautify the grass of the field, which to-day is and to-morrow is cast into the oven, much more so, we are assured, are the provisions of grace which he has made to foster, invigorate and comfort the immortal spirits who are to live before him forever. As the Sun of nature, while warming and stimulating into activity all the functions of tree and plant and flower, through all the hours of the day, is the meanwhile forming and laying up in store the moisture that is to bedew and fractify them in the night season; *so the Sun of Righteousness, while he is quickening, enlightening and sanctifying his people, in their brighter days, is at the same time fostering and strengthening the graces of faith and love and hope, which are to sustain and cheer them in the darker seasons of trial, age and infirmity.*

Piety in the soul, like the plant in the soil, is a *growth;* and that growth is carried on, in the one case as in the other, under the quickening and benignant beams that descend from on high. At first, we are but babes in Christ; then, nourished by Divine grace, we gradually increase in spiritual wisdom and stature; and, ultimately, we attain to mature manhood. Under the teachings of the Divine word and Spirit, our faith, our love, and our hope acquire strength and stability. In the habitual

exercise of the duties of piety—prayer, praise and filial obedience—we become more sensible of God's abiding presence; and the sense of that presence becomes more and more delightful to our souls, so that presently we find a calm repose in the thought that "God is near." Receiving more and more light, we come to "esteem all his precepts concerning all things to be right," and to see the reasonableness and to experience the happiness of cheerful obedience to them at all times. The Divine Character comes to appear more amiable, and more excellent and precious, from day to day. We learn to trust in God—in his promises and in his providences—with more steady calmness and serenity. We are drawn more and more frequently to renew our application to the righteousness and blood of Christ, and to renew also our covenant engagements with him. We acquire a deeper sense of our own unworthiness, of our ill-deserts, and are thus taught to receive the gifts of grace and the bounties of providence with greater thankfulness. We become more fully and practically convinced of the vanity of things seen and temporal, and are thus more powerfully moved to set our affections on things above. Imbued more and more with heavenly wisdom, we are brought to feel it our duty, and to find it our happiness, to resign our wills and our interests all to the will of God, and to say from the depths of our soul, "Father, not my will, but thine, be done; do with me as it seemeth good in thy sight."

While the Sun of Righteousness is carrying on this process of growth in grace, during the brighter days of the Christian's experience, he is all along, as is obvious, fostering and strengthening the principles, which alone can sustain and comfort him in the dark days of adversity and old age. He is preparing the dews which are to

refresh and cheer his soul in the time of trouble. What has thus served to purify the believer's heart has served also to fortify it against the onsets of affliction. His religious instruction and religious course of life have gradually prepared his mind for all the events of this inconstant state. He has put on the spiritual armour which God has provided, and is prepared for conflict and trial. Afflictions cannot attack him by surprise, for he has been taught to expect them; neither can they overwhelm him, for he has secured the help of an Almighty Friend born for adversity. "Therefore he is not overcome by disappointment, when that which is mortal, dies; or when that which is mutable, begins to change; nor when that which he knew to be transient, passes away." He knows who hath said, *All things work together for good to them that love God*, and has learned to look up to him, not with reverence only, but with trust and hope. His sources of comfort remain when the world forsakes him, and the things of the world prove of no avail. They remain to him in sickness, as in health; in poverty, as in the midst of riches; in his dark and solitary hours, no less than when surrounded with friends and society. His chief enjoyments the world did not bestow, and it is not in the power of the world to take them away. God, who is above all and blessed forever, is his Almighty and Unchangeable Friend. God is the never-failing source of his happiness and joy. God is his refuge and strength, a very present help in time of trouble. Whatever storms may arise, or enemies assail, "he shall hide him in his pavilion, in the secret of his tabernacle shall he hide him."

## ANALOGY VIII.

*As the Trees, Plants and Flowers that have their home more directly under the Sun's rays exceed in luxuriance, fruitfulness, and beauty those that have their habitation in regions more remote;—so the Souls that live more immediately beneath the beams of the Sun of Righteousness excel in spiritual vigor, fruits of grace, and beauty of holiness those who are content to live at a greater distance.*

### PHENOMENA.

THE character of vegetation is mainly determined by climate; and the climate of any particular region is decided by its position in reference to the Sun. Where the Sun is vertical, or nearly vertical, there its luminous, calorific and chemical properties are most powerful in their action, and the vegetation most luxuriant in its growth and fruitfulness; and where its rays fall most obliquely, there they are most feeble in their influence, and the vegetation most humble in its forms and productions.

If we survey those cold and distant regions embraced within the arctic circle, where the Sun's rays even in summer do but glance over the surface of the earth, while for a large portion of the year they are withdrawn altogether, we shall find only the humblest representatives of the vegetable kingdom—mosses, lichens, scurvy-grass and a few water-lilies. From these the scattered human occupants are forced to wring a considerable part of their subsistence, boiling some into soup, and converting others into coarse cakes or bread. In certain sheltered and favorable spots, two or three different kinds of diminutive bushes are found, bearing as many kinds of small berries; and these are esteemed as rare luxuries.

As we advance southward, whether in the New World or in the Old, there is a progressive increase both in the

variety and abundance of plantal growths. Let us follow a meridian line down through Europe. On reaching the North Cape, we discover a marked addition made to the arctic vegetation—tree life appears, but in a very lowly form. We first encounter the birch and the willow, but only as dwarfed and scrubby shrubs. Then come the hardy fir and spruce, not as tall and graceful trees, but rising only to the height of a few feet, and throwing out lateral branches. The hazel and the hoary alder soon follow. As we advance, to these are presently added the sycamore and the mountain-ash. On coming to the sandy soil of Denmark, we pass through fine groves of beech. Meanwhile, the oak, which began its struggling existence as far north as Drontheim, in Norway, has by degrees grown stronger and nobler; and about the latitude of London we find it rank as the monarch of the forest. As for the cereals, barley, rye and oats are the first to appear; these begin to be cultivated as far north as latitude 70°, and, like the forest trees, gradually improve in quantity and quality as we descend to milder climates.

Advancing into France and Germany, we come among fields of wheat, orchards and vineyards, gardens of flowers and esculents; and our eyes, ere long, are delighted with the sight of citrons and peaches and walnuts. And when we reach the southern extremities of this continent—Spain, Italy and Greece—we witness another notable advance in the vegetation. Here we behold, in addition to what we have just contemplated, the cypress, the chestnut, and the cork-tree; the olive and the oleander; the orange and lemon trees blooming with rich perfume; and the pomegranate and the myrtle growing wild upon the rocks. How charming the face of nature in these happy climes! How marvellous the changes through which

we have passed in our southward journey! If an Esquimaux from Greenland, or a Fin from Lapland should be suddenly dropped in the midst of a scene overspread with such vegetation, with what wonder and delight would he contemplate its richness and its beauty as compared with his own bleak and barren home! But we have not reached the end of the scale of vegetable progress yet.

We now leave Europe, and pass within the tropics. Here the three prime stimulants of vegetable growth—light and heat and moisture, all products of the Sun—prevail in their highest degrees; and here, consequently, the vegetation of our world attains its highest state of luxuriance, fruitfulness and beauty. No verbal description can convey to those who have never seen them an adequate impression of the richness and profusion of tropical growths—of the dense and magnificent forests, the abundance and variety of aromatic plants, and the gorgeous flowers and dazzling orchids, which everywhere adorn the scenery. All travellers through those regions have been overwhelmed with astonishment at the exuberance and glory of plantal life; they can find no words adequate to express their admiration. Darwin thus labors and struggles to convey to his readers the impressions he received in some of his rambles through Brazil: "While quietly walking along the shady pathways, and admiring each successive view, I wished to find language to express my ideas. Epithet after epithet was found too weak to convey to those who have not visited the intertropical regions the sensation of delight which the mind experiences. I have said that the plants in a hot-house fail to communicate a just idea of the vegetation, yet I must recur to it. The land is one great wild, untidy, luxuriant hot-house, made by Nature herself, but

taken possession of by man, who has studded it with gay houses and formal gardens. How great would be the desire in any admirer of Nature to behold, if such were possible, the scenery of another planet! Yet to any person in Europe it may be truly said that, at the distance of only a few degrees from his native soil, the glories of another world are open to him. In my last walk I stopped again and again to gaze on those beauties, and endeavored to fix in my mind forever an impression which at the time I knew sooner or later must fail. The form of the orange tree, the cocoanut, the palm, the mango, the fern-tree, the banana, will remain clear and separate; but the thousand beauties which unite them into one perfect scene must fade away; yet they will leave, like a tale told in childhood, a picture full of indistinct, but most beautiful figures."

In this middle zone of the globe flourish the graceful palms in all their varieties; the spice-bearing trees, the nutmeg, the clove, the cinnamon, and the pepper tree. Here also are found the odoriferous sandal, the ebony, the banyan, and the teak; the coffee-tree, and the tamarind; the frankincense, and the myrrh, and other incense-bearing plants.

The fruitfulness of the intertropical region is equally remarkable. Trees and plants yield far more abundantly than in any other parts. Here nearly all that man needs for his support is provided for him almost spontaneously. The bread tree is loaded with fruit eight months in the year; four hundred cocoanuts may be gathered from one palm; and six hundred pounds of sago from a single tree. And a small amount of labor is rewarded with the most abundant returns; from one-quarter of an acre 3,000, and even 4,000, pounds of bananas can easily be raised. So of a vast variety of other fruits and nourish-

TROPICAL VEGETATION.

ing productions—the earth brings them forth with ease and in rich profusion.

It is further to be observed that, the vegetation of the tropical regions is arrayed in colors of unrivalled richness. Here, where the Sun shines forever unchangeably bright, every plantal growth wears a hue the most intense and perfect after its kind. The darkest green prevails over the leaves of plants; the flowers and fruits are tinctured with colors of the deepest dye, whilst the plumage of the birds is of the most variegated description and of the richest hues. In the temperate climates everything is of a more subdued variety; the flowers are less bright of hue; the prevailing tint of the winged tribes is a russet brown. In the colder portions of the earth there is but little color; the flowers are generally white or yellow, and the animals exhibit no other contrast than that which white and black afford.

Such, in brief, is the gradation observable in the forms, fruits and beauties of the vegetation of our globe as we pass from its polar to its tropical regions,—the character of plantal growths being determined throughout the long scale mainly by its position in reference to the Sun.

## Teachings.

To all that we have now observed to prevail in the kingdom of plantal life, we find a striking parallel in the domain of spiritual life. As the trees, plants, and flowers, which have their home more directly under the Sun's rays, exceed in luxuriance, fruitfulness, and beauty those that have their habitation in regions more remote;—*so the souls that live more immediately beneath the beams of the Sun of Righteousness excel in spiritual vigor, fruits of grace, and beauty of holiness those who are content to live at a greater distance.*

If we could see, with the natural eye, the forms, and sizes, and colors of the plants of piety, as we can those which spring out of the soil, we should behold not only as great a variety, but also a similar gradation among the former as among the latter—we should have Arctic piety, Temperate piety, and Tropical piety.

There is a class of Christians that may be aptly compared to the plantal growths of the *Arctic regions*—mosses, lichens, lowly bushes, dwarfed trees—which, owing to the cold and dreary climate they occupy, never attain to any size, or strength, or beauty. Like these, many of the professed followers of Christ, live at such at distance from him, the Fountain of spiritual light and heat, that they remain dwarfish, and fruitless, and featureless through all their days. The germ of life, indeed, has been implanted within them, but it does not thrive or grow, for it is not nourished with the word of truth, nor refreshed by the dews of prayer, nor quickened by the warm beams of grace, as it might and should be. They live, and choose to live, in a country that is remote and cold, and dreary, and where all the powers of the soul remain barren and stunted. The faith that is in them is so feeble as to inspire but little activity, their love so languid as seldom to prompt to an effort or a sacrifice, and their hope so faint as scarce to awaken a gleam of joy. Their inward frame is as a continuous gray and joyless arctic day. Of the happy experiences of living and elevated piety they know as little as doth the dweller of Greenland of the luxuriant scenes, fragrant flowers, and luscious fruits of the tropics. Abiding at such a distance from Christ the Sun of Righteousness, and living so far beneath their privileges, they wrong and they famish their own souls.

A second class of Christians may be likened to the

more vigorous and fruitful trees and plants of the *Temperate Zone.* These have their roots imbedded in richer soil, and their branches spread out beneath clearer and warmer skies. They are persons of more enlightened and active piety than the former. They are firm in the faith and settled in the practice of the Gospel. They engage in the devotions and discharge the duties of religion, not from mere impulse or feeling, but from principle. They habitually read the Word and offer prayer, attend the public worship of God, and contribute of their substance for the support and furtherance of the Gospel. Their purpose of life, however, is rather to maintain "the even tenor of their way," than to press forward, or to rise higher, in spiritual attainments. They believe that they should grow in grace; yet, mingling much with the world, and breathing long in its depressing atmosphere, they make no very marked progress; they are rarely elevated to very ardent experience, or very joyous hopes. But the root of the matter is in them; they have faith, and prove its existence and genuineness by their readiness to aid in every good work. Like trees planted by the rivers of waters, they bring forth their fruit in its season; their leaves also preserve their verdure, and fade not. Christians of this grade are relatively numerous in every congregation; they compose largely the strength of the church, and to their labors and contributions her benevolent enterprises owe, in no small measure, their success at home and abroad. Nevertheless, in their own souls, they come short of the fulness of the blessing of the Gospel of Christ. For this, we are to look to

Another and a third class of Christians, who may be compared to the luxuriant and beautiful plantal growth of the *Tropical Regions.* These are, in important re-

spects, as much in advance of the second class, as the second is of the first. They have made greater attainments in the divine life—in the renunciation of the world, the crucifixion of the flesh, the submission of the will and desires, and the consecration of the whole soul to God and his service. They have risen to higher spiritual experience—to the full assurance of faith, the witness of the Spirit, and the love that casteth out all fear—to the peace which passeth all understanding, and the joys that are unspeakable and full of glory. Having made their abode as beneath the direct radiance of the Sun of Righteousness, every faculty is graciously stimulated, and every affection blooms forth in tropical beauty and perfection. Contemplating so habitually, and admiring so devoutly his Divine Excellencies—his purity, his tenderness, his mercy, his sweetness, his beauty, his love—they have been moulded into his likeness, and assimilated to his Spirit. "We, with open face," saith the apostle, "beholding as in a glass the glory of the Lord, are changed into the same image from glory to glory, even as by the Spirit of the Lord." In them the fruits of the Spirit do abound—love, joy, peace, longsuffering, gentleness, goodness, faith, meekness, and temperance; they live in the Spirit; they also walk in the Spirit. But as the fertility and fruitfulness of Canaan were best set forth by a sample from the vines of Eschol, so the virtues and graces of this higher and brighter zone of spiritual life will be best understood and appreciated by living instances. An example or two, therefore, will be in place here.

Rev. Edward Payson, D. D., of Portland, Maine, was a man of fine intellectual powers and scholarly attainments, and at the same time a man equally distinguished for his personal piety and public usefulness. His course

from the day of his conversion, so to speak, was toward the warm and sunny south, and the years of his fruitful life were spent for the most part, as beneath the tropic skies. In a letter to his sister, September 19, 1827, he describes his frame of mind in the following graphic manner: "Were I to adopt the figurative language of Bunyan, I might date this letter from the land of Beulah, of which I have been for some weeks a happy inhabitant. The celestial city is full in my view. Its glories beam upon me, its odors are wafted to me, its sounds strike upon my ears, and its spirit is breathed into my heart. Nothing separates me from it but the river of death, which now appears but as an insignificant rill, that may be crossed at a single step, whenever God shall give permission. The Sun of Righteousness has been gradually drawing nearer and nearer, appearing larger and brighter as he approached, and now he fills the whole hemisphere; pouring forth a flood of glory, in which I seem to float like an insect in the beams of the Sun; exulting, yet almost trembling, while I gaze on this excessive brightness, and wondering, with unutterable wonder, why God should deign thus to shine upon a sinful worm. A single heart and a single tongue seem altogether inadequate to my wants: I want a whole heart for every separate emotion, and a whole tongue to express that emotion."

Another tropical saint, Lady Maxwell, relating her inward and spiritual exercises, says, "Time would fail me to tell of the numberless manifestations of divine love and power that have been granted unto me. I have, though deeply unworthy, been favored with such wonderful lettings into Deity as no language can describe or explain; but the whole soul dilates itself in the exquisite enjoyment; so refined, so pure, so tempered with sacred awe, so guarded by heavenly solemnity, as effectually to prevent

all irregularity of desires. These, with every power of the mind, bow in holy subjection before Jehovah. Surely the feelings of the soul on these memorable occasions are nearly similar to those enjoyed by the heavenly inhabitants."

Another devoted disciple of Jesus, Mr. James Brainerd Taylor, has left the following interesting and instructive account of what may be designated as his passage from the Temperate to the Tropical Zone of religious experience: "I felt that I needed something which I did not possess. There was a void within, which must be filled, or I could not be happy. My earnest desire then was, as it had been ever since I professed religion six years before, that all love of the world might be destroyed —all selfishness extirpated—pride banished—unbelief removed—all idols dethroned—everything hostile to holiness, and opposed to the divine will, crucified; that holiness to the Lord might be engraved on my heart, and evermore characterize my conversation. My mind was led to reflect on what would probably be my future situation. It recurred to me, *I am to be hereafter a minister of the Gospel.* But how shall I be able to preach in my present state of mind? I cannot—never; no, never shall I be able to do it with pleasure, without great overturnings in my soul. I felt that I needed *that*, for which I was then, and for a long time had been, hungering and thirsting. I desired it, not for my benefit only, but for that of the church and the world. At this very juncture I was most delightfully conscious of giving up ALL to God. I was enabled in my heart to say, 'Here, Lord, take me, take my whole soul, and seal me thine—thine now, and thine forever. If thou wilt, thou canst make me clean.' There then ensued such emotions as I never before experienced—all was calm and tranquil, silent,

solemn—and a heaven of love pervaded my whole soul. I had a witness of God's love to me, and of mine to him. Shortly after, I was dissolved in tears of love and gratitude to our blessed Lord. The name of Jesus was precious to me, 'twas music in my ear. He came as King, and took full possession of my heart; and I was enabled to say, Let him, as King of kings and Lord of lords, reign in me, reign without a rival forever!—Since that blessed season I have enjoyed times of refreshment, in which I have gained *nearer* access to God. I have enjoyed his presence from day to day. Not one, I believe, has passed, in which I have not had the witness in myself that I am born from above. O the peace which I have had, and joy in the Holy Ghost! It has flowed as a river. I have been happy in my Lord. I have exulted in the God of my salvation!"

That great and good man, Jonathan Edwards, president of Yale College, equally distinguished for his learning and piety, has left a very full and instructive account of his religious exercises; and the following extracts from that account will sufficiently indicate how immediately beneath the bright and benignant beams of the Sun of Righteousness he lived, and what gracious fruits he bore: "After this, my sense of divine things gradually increased, and became more and more lively, and had more of that inward sweetness. The appearance of everything was altered; there seemed to be, as it were, a calm, sweet cast, or appearance, of divine glory, in almost everything. God's excellency, his wisdom, his purity and love, seemed to appear in everything; in the Sun and moon and stars; in the clouds and blue sky; in the grass, flowers, trees; in the water and all nature. . . . . Scarce anything, among all the works of nature, was so sweet to me as thunder and lightning: formerly, nothing had been so

terrible to me; but now, on the contrary, it rejoiced me. I felt God, so to speak, at the first appearance of a thunder storm; and used to take the opportunity, at such times, to fix myself in order to view the clouds, and see the lightnings play, and hear the majestic and awful voice of God's thunder, which oftentimes was exceedingly entertaining, leading me to sweet contemplations of my great and glorious God. . . . . I had vehement longings of soul after God and Christ, and after more holiness, wherewith my heart seemed to be full, and ready to break. . . . . My mind was greatly fixed on divine things; almost perpetually in the contemplation of them. I spent most of my time in thinking of divine things, year after year; often walking alone in the woods, and solitary places, for meditation, soliloquy and prayer, and converse with God. I was almost constantly in ejaculatory prayer, wherever I was. Prayer seemed to be natural to me, as the breath by which the inward burnings of my heart had vent. . . . I felt a burning desire to be in everything a complete Christian; and conformed to the blessed image of Christ; and that I might live, in all things, according to the pure, sweet, and blessed rules of the gospel. I had an eager thirsting after progress in these things, which put me upon pursuing and pressing after them. It was my continual strife day and night, and constant inquiry, how I should *be* more holy, and *live* more holily, and more becoming a child of God, and a disciple of Christ. . . . The heaven I desired was a heaven of holiness; to be with God, and to spend my eternity in divine love, and holy communion with Christ. My mind was very much taken up with contemplations on heaven, and the enjoyments there; and living there in perfect holiness, humility and love. . . . Holiness appeared to me to be of a sweet, pleasant, charming, serene, calm nature; which brought

an inexpressible purity, brightness, peacefulness and ravishment to the soul. In other words, that it made the soul like a field or garden of God, with all manner of pleasant flowers; all pleasant, delightful, undisturbed; enjoying a sweet calm, and the gently vivifying beams of the Sun. The soul of a true Christian, appeared to me like such a little white flower as we see in the spring of the year; low and humble on the ground, opening its bosom to receive the pleasant beams of the Sun's glory; rejoicing as it were in a calm rapture; diffusing around a sweet fragrancy; standing peacefully and lovingly, in the midst of other flowers round about; all in like manner opening their bosoms, to drink in the light of the Sun. . . . I had great longings for the advancement of Christ's kingdom in the world, and my secret prayer used to be, in great part, taken up in praying for it. If I heard the least hint of anything that happened, in any part of the world, that appeared, in some respect or other, to have a favorable aspect on the interests of Christ's kingdom, my soul eagerly catched at it; and it would much animate and refresh me. I used to read the public newspapers mainly for that end. . . . . I had the greatest delight in the holy Scriptures, of any book whatsoever. Oftentimes in reading it, every word seemed to touch my heart. I felt a harmony between something in my heart, and those sweet and powerful words. I seemed often to see so much light exhibited by every sentence, and such a refreshing food communicated, that I could not get along in reading; often dwelling long on one sentence, to see the wonders contained in it; and yet almost every sentence seemed to be full of wonders. . . . . I have sometimes had a sense of the excellent fullness of Christ, and his meetness and suitableness as a Saviour; whereby he has appeared to me,

far above all, the chief of ten-thousands. Once, having retired into the woods for my health, I had a view that for me was extraordinary, of the glory of the Son of God, as Mediator between God and man, and his wonderful, great, full, pure and sweet grace and love, and meek and gentle condescension. This grace which appeared so calm and sweet, appeared also great above the heavens. The person of Christ appeared ineffably excellent with an excellency great enough to swallow up all thought and conception—which continued, as near as I can judge, about an hour; which kept me the greater part of the time, in a flood of tears, and weeping aloud. I felt an ardency of soul to be, what I know not otherwise how to express, emptied and annihilated; to lie in the dust, and to be full of Christ alone; to love him with a holy and pure love; to trust in him; to live upon him; to serve and follow him; and to be perfectly sanctified and made pure, with a divine and heavenly purity. I have, several other times, had views very much of the same nature, and which have had the same effects upon my mind."—Such was the inner life of this distinguished philosopher, such the bright and happy clime he had reached and in which he spent his useful days.

Examples such as the foregoing might be multiplied indefinitely, as they may be found in all ages of the church, and among all classes of Christians. I shall add, however, but one more, and that shall be the worthy consort of the last named saint, Mrs. Jonathan Edwards. Having by earnest prayer and sincere self-consecration sought and obtained the indwelling presence of the Holy Ghost, she describes her feelings in these words: "I cannot find language to express how certain the everlasting love of God appeared—the mountains and hills were but as shadows to it! My safety, and happiness,

and enjoyment of God's immutable love, seemed as durable and unchangeable as God himself. Melted and overcome by the sweetness of this assurance, I fell into a great flow of tears, and could not forbear weeping aloud. The presence of God was so near, and so real, that I seemed scarcely conscious of anything else. I seemed to be taken under the care and charge of my God and Saviour, in an inexpressibly endearing manner. The peace and happiness which I thereafter felt were altogether inexpressible. The whole world, with all its enjoyments, and all its troubles, seemed to be nothing; my God was my all, my only portion. No possible suffering appeared to be worth regarding; all persecutions and torments were a mere nothing. At night, my soul seemed to be filled with an inexpressibly sweet and pure love to God and to the children of God, which made me willing to lie on the earth at the feet of the servants of God, to declare his gracious dealings with me, and breathe forth before them my love and gratitude and praise."—Speaking of her experience, on another occasion, she says, "I seemed to perceive a glow of divine love come down from the heart of Christ in heaven into my heart, in a constant stream, like a stream of sweet light. At the same time, my heart and soul all flowed out in love to Christ; so that there seemed to be a constant flowing and reflowing of heavenly and divine love from Christ's heart to mine; and I appeared to myself to float in these bright sweet beams of the love of Christ, like the mote swimming in the sunbeam."

Such is what we may well call Tropical Piety. And, as compared with that we have characterized as Arctic, or even as Temperate, how luxuriant its growth, how sweet and abundant its fruits, how rich and beautiful its flowers and its foliage! In passing from the poles of the

earth to its equator, we witness in its vegetation no greater changes, or more surprising differences, than we observe in the several grades of religious development which we have now contemplated. And whence arises this great and wide diversity? From their situation in reference to the great Fountain of light and heat. As in the realm of nature, so in the kingdom of grace, the souls that live more immediately beneath the warm and luminous beams of the Sun of Righteousness, excel in spiritual vigor, in fruits of grace, and in beauty of holiness, those who are content to abide at a greater distance. Tropical fruits require a tropical Sun to foster and ripen them; so likewise, maturity of piety can only be attained by close and habitual communion with Christ. They who would know the full power and peace and blessedness of his religion must draw near and abide as beneath the light of his countenance. "He that abideth in me, and I in him, the same bringeth forth much fruit; for without me ye can do nothing."

"O Jesu, teach me like thyself to fly
This poisonous world, and all its charms defy.
Give me devotion which shall never tire,
Fix'd contemplation which my love may fire;
A heavenly tincture in my whole discourse,
A fervent zeal which may my prayers enforce;
Of heavenly joys a sweet foretasting view,
That I on earth may only heaven pursue."—*Bp. Ken.*

## ANALOGY IX.

*As the Sun's warm rays may be conveyed and converged through a lens with melting or consuming power to objects beyond, while the temperature of that lens itself remains unchanged;—so the quickening truth of the Sun of Righteousness may be communicated by a speaker or a writer with softening and saving power to others, while he himself remains unchanged and uninfluenced by that truth.*

### Phenomena.

The heat of the Sun comes to us associated with its light; the two, however, are not indissolubly connected, but may be readily sifted and separated. This can be done by receiving the sunbeams on, or passing them through, certain media; for, some substances there are, which, while transparent to light, are not so to heat; and others, while transparent to heat, are impervious to light. Transparency to light, therefore, does not necessarily imply transparency to radiant heat. In other words, if a sunray be received on certain substances the light will pass through them, while the heat will be almost entirely intercepted; on the other hand, if the ray be received on other substances, the light will be completely obstructed, while the heat will pass freely through them. Of all this the following are examples: a thin plate of rock-salt will transmit 92 per cent. of the solar heat falling upon it; while a similar plate of alum, though translucent, will permit the passage of only 12 per cent. Black mica, obsidian, and black glass are nearly opaque to light, but they allow 90 per cent. of radiant heat to pass through them. Whereas a pale green glass, colored by oxide of copper, covered with a layer of water, although perfectly transparent to solar light, will almost completely obstruct the permeation of solar heat. Distilled water, though extremely transparent to the rays of light, is practically

opaque to those of heat; on the contrary, the liquid called bisulphide of carbon freely admits heat rays to pass through it. Alcohol is almost opaque to heat rays, while the chloride of phosphorus allows them freely to pass. From numerous and varied experiments made with such substances as these it has been clearly proved that the solar light and heat may be separated from one another.

The sunbeams, however fierce, in passing through pure dry air do not sensibly warm it. Travellers tell us that, on high mountains, the solar rays strike on the exposed parts of the body, such as the face or hands, with almost intolerable heat, while the atmosphere through which they pass remains cold as ice. "I never, on any occasion," says Tyndall, "suffered so much from solar heat as in descending from the Corridor to the Grand Plateau of Mount Blanc, on August 13, 1857; though my companion and myself were at the time hip-deep in snow, the Sun blazed against us in unendurable power. Immersion in the shadows of the Dôme du Goûté at once changed my feelings; for here the air was at a freezing temperature. It was not, however, sensibly colder than the air through which the sunbeams passed; and we suffered, not from the contact of hot air, but from radiant heat, which had reached us through an icy cold medium." Humboldt and others relate similar experience on great elevations.

As with pure dry air, so with pure and clear glass, the beams of the Sun will pass through it without sensibly heating it. The summer Sun may shine upon a pane of such glass for hours together without essentially affecting its temperature. And the explanation which philosophers give of this remarkable fact is this: The luminiferous ether, whose vibrations produce light, not only fills all

the unoccupied spaces of the universe, but penetrates all matter, and surrounds the very atoms that compose both solid and liquid substances. And "transparent bodies are such, because the ether and the atoms of such bodies are so related to each other, that the waves which excite light can pass through them without transferring their motion to the atoms;" see Tyndall's *Heat a Mode of Motion*, § 346, 517.

On the same principle, a lens of pure glass, a large convex lens, placed beneath the unobscured sunbeams, will transmit and converge them into a focus of sufficient heat to melt silver or gold into liquid, and yet remain itself unchanged in its temperature. This has often been proved by actual experiment.*

The same phenomenon may be exhibited with a concave mirror. Let this be set facing directly the clear Sun, and it will reflect its warm rays into a focus of such intense heat as will melt the most refractory metals, while it continues itself quite cool.

And what seems more wonderful still, lenses of great power may be formed of ice. In 1763, experiments were made in England with a lens of ice, ten feet in diameter, which was exposed to the Sun, and in the focus of which gunpowder was ignited. And Professor Tyndall, in his late lectures on *Light*, delivered in America, alluding to this, says, "The same effect may be produced with a small lens, and with a terrestrial source of heat. In an iron mould we have fashioned this beautiful lens of transparent ice. At the focus of the lens I place a bit of black paper, with a little gun-cotton folded up within it. The paper ignites and the cotton explodes. Strange, is it not, that the beam should possess such heating power after having passed through so cold a substance?"

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* See Part III., Analogy 1.

The foregoing facts, namely, the transparency and opacity of material substances to solar light and heat, are suggestive of very interesting and instructive thoughts. These two qualities, as already intimated, depend upon the relation which subsists between the atoms that compose different substances and the ether which permeates them. But an exceedingly slight change in this relation would make a transparent body opaque, or an opaque one transparent. Hence, in this delicate relation, we discover a striking evidence of the foresight, wisdom and goodness of the Creator who established it; for the welfare of the human race, and of every living thing, in no small degree depends upon it. A moment's reflection will make this evident.

If *no substance* pertaining to our globe was transparent to *light*, how different would be our condition from what it actually is! How changed the aspect of the scenes and objects around us! Our skies and our fields would wear a different hue. The waters of our lakes and rivers and springs would be as black as ink. Our dwellings would be without their glazed windows, and, through the winter half of the year at least, would be as dark in the daytime as in the night, save as relieved by artificial light. Our eyes, growing dim with age, would never know the invaluable service of spectacles. The diamond would never adorn the bosom of the fair, nor flash in its brilliancy from the crown of kings. The telescope which reveals the mighty wonders of the heavens, and microscope which discloses the minute mysteries of the earth, would have been instruments unthought of, and, indeed, impossible. In short, we should be destitute of a hundred things that now minister to our comfort and convenience and instruction. On the other hand, if *all substances* were transparent to *light*, evils no less serious

would ensue. In such a case there would be no such thing as privacy or seclusion, except in the distance of solitude. We should be as unscreened within our habitations as upon the open street. There could be no such place as a secret closet for prayer, or for any other duty or purpose; but our doors would be as open windows, and our walls as so many panes of plate-glass. In all circumstances and conditions we should be exposed to the gaze of the passers by, whether awake or asleep.

Again: If *no substance* was transparent to solar *heat*, but every earthly material an effectual bar against it, there is no counting or estimating the inconveniences and discomforts with which man would be left to struggle, if, in fact, he could maintain an existence at all. On the contrary, if *all substances* were alike transparent to his *heat*, other and opposite evils would result; to name no more, there would be no shelter from the hot, oppressive beams of the summer's Sun; nor tree, nor roof, nor projecting rock would protect us; his scorching rays would everywhere beat down upon us, as upon the head of Jonah before the gourd sprang up to shade him and to deliver him from his grief.

How different from all this do we find the actual arrangement of our world to be. Infinite Wisdom, foreseeing these evils and discomforts, has obviated them all, and secured the greatest amount of convenience and advantage, by giving to the atoms of the various substances of the earth that *precise constitution* which renders them most suitable to the condition and wants of man, making some transparent and some opaque, alike to light and heat, and that in varying degrees, so that he may ever find among them what meets his convenience or necessity. And herein we have another proof and illustration of the word that is written, "He is wonderful in counsel and excellent in working."

## TEACHINGS.

From the foregoing subject we may gather an important lesson of a spiritual and practical nature. As the Sun's warm rays may be conveyed and converged through a lens of glass, or even of ice, with melting or consuming power to objects beyond, while the constitution and temperature of that lens itself remain unchanged; *so the quickening truth of the Sun of Righteousness may be communicated by a speaker or a writer with softening and saving power to others, while he himself remains unchanged and uninfluenced by that truth.*

History, both sacred and profane, supplies us with numerous evidences that bad men have often been agents in accomplishing great good, and that base hypocrites have not unfrequently proclaimed the pure word of God with power and saving success. Balaam prophesied, while he "loved the wages of iniquity." Saul appeared among the prophets, while he was meditating murderous designs against the life of David. Judas Iscariot was found preaching the kingdom and casting out devils, while he was himself a devil and a thief. Simon the Sorcerer was baptized into the faith of Christ, and was desirous to equal the apostles in mighty wonders, while he was "in the gall of bitterness, and in the bond of iniquity." Paul speaks of some at Rome, who preached Christ with such good effect as caused him to rejoice therein, yet he is constrained to testify concerning them that they did it only through "envy" and "strife." The apostle John says that, in his time, "many false prophets were gone out into the world." In the first ages of the Christian church, as Origen informs us, not a few were enabled to exercise miraculous gifts, while they followed not with "our Lord's true disciples." And many, in every age, have possessed no small zeal in the cause of the gospel,

while their "hearts were not right in the sight of the Lord."

Hence this emphatic and solemn declaration of our blessed Saviour: "Many will say to me at that day, Lord, Lord, have we not prophesied in thy name? and in thy name have cast out devils? and in thy name done many wonderful works? Then will I profess unto them, I never knew you. Depart from me, ye that work iniquity." On these words the learned Dr. Adam Clarke makes this comment: "*I never knew you*, that is, I never *approved* of you. You held the truth in unrighteousness, while you preached my pure and holy doctrine: and for the sake of my own truth, and through my love for the souls of men, I blessed your preaching; but yourselves I could never esteem, because ye were destitute of the spirit of my gospel, unholy in your hearts, and unrighteous in your conduct. Alas! alas! how many preachers are there who appear *prophets* in their pulpits; how many writers, and other evangelical workmen, the miracles of whose labor, learning and doctrine we admire, who are nothing, and worse than nothing, before God; because they perform not his will, but their own. What an awful consideration, that a man of eminent gifts, whose talents are a source of public utility, should be only a way-mark, or finger-post, in the way to eternal bliss, pointing out the road to others, without walking in it himself!"

That an unconverted man may preach the doctrines of Christianity with effect, and become the means of the conversion of sinners and of the edification of the body of the church, paradoxical as it may appear, is a fact not to be doubted. As the rays of the Sun of nature do not lose their heat in passing through a lens, though made of ice; so the truths of the Sun of Righteousness do not lose their power in passing through a human medium,

though that medium be corrupt. The gospel is not necessarily rendered of none effect because uttered by unsanctified lips, any more than because printed by unsanctified hands. Truth is incorruptible. And Divine truth, in any case, becomes effectual in enlightening and converting the soul only through the gracious influences of the Spirit attending and following it. And God may sometimes (but he does not usually) see fit to honor his word in this way, however unworthy the agency that may proclaim it. Of this the following instance, among a multitude that might be adduced, may serve both as a proof and illustration: "A clergyman of the Church of England was left by the death of his relatives the last of his family; and, resolving to emigrate to America, took ship with his worldly effects, to end his days with preaching the gospel here. A criminal, leaving his country for his country's good, in the same ship, concealing his true character, became intimate with the clergyman. On the passage, however, the latter took sick, was nursed assiduously by the other, and, dying, left all his effects, including his sermons, letters, and testimonials, to the unknown nurse. Upon arriving safe in this country, the criminal assumed the name of the deceased, and, presenting the letters and credentials of the departed to the bishop, was invited to preach; which he did, using one of the sermons he had inherited, and was called to a church, where he officiated acceptably for several years. The truth would not have been discovered, had not the wretched impostor divulged it on his death-bed."

That a speaker or writer, who himself is in nature's darkness, should be able thus to instruct, comfort and encourage the saints of God, involves nothing, implies nothing, that is incredible. What he presents and knows only in the letter, they apprehend in the spirit

and translate into experience. By means of the truths which he utters, he inspires in regenerated souls thoughts and emotions and affections, to which his own is an utter stranger. In this way he unconsciously teaches what he has never known. As a man born blind, by study, may come to understand the laws of light, and even be able to impart instruction to those of clear sight concerning the principles which govern its reflection, refraction, and dispersion, though a ray has never entered his sightless eyeballs; so a preacher, or an author, whose eyes the Spirit has never opened, may be able to reason well, and to impart much important instruction, concerning the light of the Sun of Righteousness, though a beam from his countenance may never have entered into his soul. Or, to employ another and different comparison: As a man who remains at home, by mere study of the directions and distances ascertained and recorded by others, can draw an accurate map of a country, and delineate thereon the roads with all their turns and passes and prospects that lead to the metropolis, which he has never seen nor ever will see, may thus render great service to others that are travelling thither; so an unconverted minister, by the mere study of Scripture facts and doctrines, may prove very helpful to many prilgrims who are on their way to the heavenly Jerusalem, though he himself take not a step toward that happy place.

Many unregenerated men, no doubt, enter the ministry, and continue exercising its sacred offices, deceiving *themselves*, as well as others, as to their calling and fitness for it. Studying the doctrines of the Christian religion, as they study a system of philosophy, and having acquired a pretty clear idea of the letter, they presently conclude that they also know the spirit thereof. And the very course of life afterward pursued by them tends to confirm

and perpetuate the delusion. Ever leading the devotions of others with decorum and solemnity, how natural the idea that they are devout themselves. Doing nothing so much as read and study about Christ, and preach and pray and talk about heaven—how like a spiritual and heavenly life is all this. But, alas! they know not what spirit they are of. They do but gather manna for others, which they themselves eat and digest not, neither, indeed, have evertasted. Good service and great help they may render to others by the truth they proclaim; but they profit not themselves by it. As the cold lens conveys to other objects light and heat which itself never feels, so these may be instrumental in kindling light and heat in the hearts of others, which they themselves have never experienced.

What, then, does all this teach us? Not, indeed, that conversion is a matter of indifference to success; for it is; this is the rule, while the contrary is the exception. But the great and serious lesson is, that *a man's success in the ministry, success in converting sinners and edifying saints, is no certain evidence that his own soul is in a safe state.* Let all who have assumed the sacred office remember the Saviour's words, "Many will say to me in that day, Lord, Lord, have we not prophesied in thy name? and in thy name have cast out devils? and in thy name done many wonderful works? And then will I profess unto them, I never knew you: depart from me."

## ANALOGY X.

*As the Sun of Nature, in drawing upward the vapors that are to form the fleecy clouds on high, separates and leaves behind every particle of the gross materials with which, as water, they had been connected;—so the Sun of Righteousness, when he lifts the souls of his redeemed to the skies, divests them of all the corruption with which they had been affected in the body, so that they ascend pure and stainless to dwell in his presence.*

### PHENOMENA.

WATER, pure water, consists of two simple or elementary substances, oxygen and hydrogen, mixed in the proportion, by weight, of 8 parts of the former to 1 part of the latter. In other words, 9 pounds of pure water contain 8 pounds of oxygen and 1 pound of hydrogen. But in nature, or on the face of our globe, water is never found in this perfectly pure state; it always holds in solution more or less of the various substances with which, in its ceaseless flow and circulation, it comes in contact. That which rises and gushes forth in springs is contaminated by the materials it encounters in percolating through the soil and the crevices of the rocks. And the impurity of that which flows in rivers is often discernible to the eye. Rivers that flow over ferruginous rocks or through marl impregnated with considerable oxide of iron are of a red color. Those that run over beds of chalk or white earth, as the streams from the glaciers of Iceland and the slopes of the Andes, are milky in their appearance. Those whose channels are scooped out through alluvial plains or rich prairies, as the Rio Nigro, in South America, are black with vegetable matter. While waters that gush from heated depths, as geysers, exhibit a greenish hue, from the yellow matter they have dissolved.

Water, also, often contains many impurities that are not to be detected by the eye. Among the rocky and

other substances with which it comes in contact in its course over the surface or through the strata of the earth, there are many it can dissolve, as it does sugar or salt, and the presence of which cannot be discerned by the sight. Hence the clearest streams and the brightest springs are often far from being pure water; in fact, they all contain in solution a greater or less quantity of saline matter, sometimes so much of it, as to give them a decided taste, and to form what are hence called *mineral waters.*

The waters of many springs and streams, while they are bright and sparkling to the eye, and even pleasant to the taste, are so strongly impregnated with lime, that they will deposit a calcareous coating along their channels, and incrust wood or any solid substance which may be immersed in them. Of all this, interesting examples may be seen among the volcanic mountains of Auvern, in France, and at Matlock and Knaresborough, in England. Kettles and steam-boilers in which such water is heated, soon become thickly-lined with an incrustation of lime.

In many sandy districts of country, the water that sinks and collects into wells, carries with it so much of vegetable solutions, that if a little tannin be thrown into it, or if it be boiled, these solutions will separate and form into flakes or clots. Such is the water of the Seine, at Paris; of the sandy Landes of Bordeaux; and of many of the marshy streams of India. And such, we have good reason to believe, were the bitter waters of Marah.

The waters of the Jordan contain 73 grains of mineral matter to the gallon; and the river Thames, near London, 21 grains to the gallon. Among the purest natural waters hitherto examined is that of the Loka, in the north of Sweden, which flows over hard impenetrable granite, and other rocks, upon which water produces

little impression; this contains only one-twentieth of a grain of mineral matter to the gallon. The nearest in purity to this is found in some of the granite districts of Scotland, which holds from 4 to 5 grains to the gallon.

The water used for domestic purposes in all the great cities of the world contains solutions of minerals and of other substances. That which supplies the city of Edinburgh contains from 7 to 14 grains of mineral matter to the gallon; and that of London from 20 to 35 grains to the gallon. These are esteemed waters of average purity. The Cochituate, which supplies Boston, U. S., has 3.67 grains of solid matter to the gallon; the Croton River of New York, 4.56 grains; and Lake Michigan, from which Chicago draws its supply, 6.68 grains.

Leaving these smaller bodies of water, and turning to the great reservoirs of the globe, the oceans, we find them far more impure than any that have been now named. Sea water is mingled with a large measure of the solutions of various substances, *common salt* being the most abundant. The waters of the Black Sea and Sea of Azof are just brackish with it; those of the great ocean are salty; those of the Mediterranean, more so; while those of the Caspian Sea, the Dead Sea, and the Lake Aral, are much more so yet. As all the solid matter carried by rivers into these remains in them, it follows that their waters have been growing more and more briny and bitter in their taste.

The waters of the great oceans, the Atlantic, Pacific and Indian, contain from 2,200 to 2,800 grains of saline matter in the gallon; those of the Dead Sea from 11,000 to 21,000 grains. Or, to give both quantities in the same denomination—a gallon of ocean water weighs 10¼lbs., and contains nearly one-half pound of matter in solution; while a gallon of the Dead Sea water weighs

12¼lbs., and contains a little over 3lbs. of dissolved matter.

Riegel gives the following analysis of the ocean water. His sample was taken off the coast of France, near Havre, and contained, in 1,000 parts by weight 31½ parts of solid matter (2,250 grains in the gallon), consisting of—

| | |
|---|---|
| Chloride of sodium (common salt) | 24.632 |
| Chloride of potassium | 0.307 |
| Chloride of calcium | 0.439 |
| Chloride of magnesium | 2.564 |
| Bromide of magnesium | 0.147 |
| Sulphate of lime (gypsum) | 1.097 |
| Sulphate of magnesia (Epsom salts) | 2.146 |
| Carbonate of lime (chalk) | 0.176 |
| Carbonate of magnesia | 0.078 |
| Total of solid matter | 31.586 |

Professor J. F. Johnston, speaking of the above analysis, says, "Besides these substances, traces of phosphate of lime, of silica, of the oxides of iron and manganese, of iodine, of fluorine, and even of lead, copper, silver, and arsenic, have been detected in sea water. Indeed, we know that, being the common reservoir into which all soluble substances are washed down by the rains and rivers, we ought to find in the sea traces of all the soluble substances which are capable of existing together in the same solution.

There is, then, no pure water to be found on the face of the earth. Whether taken from well or spring, river or lake, or from the great and wide sea, it contains many impurities; that is, the solutions of many and various substances, besides the simple combination of eight parts of oxygen and one part of hydrogen, which composes this element in its purity.

Water thus variously mingled with other substances overspreads the surface of our globe. The oceans com-

pletely cover three-fourths of that surface; and the remaining fourth is studded with lakes, traversed by many large rivers, and irrigated by ten thousand minor streams, brooks and rills; and even the solid soil is everywhere, to a greater or less degree, saturated with it. Now, from every square mile, every square foot, of this surface, whether sea or land, the Sun, like a mighty and untiring engine, is constantly, winter and summer, drawing up in the form of vapor vast quantities of this water to form the clouds and furnish the rains that are to refresh the earth and nourish its inhabitants.* But in doing this, he *eliminates and leaves behind* all the saline and other substances in solution with which it may be combined. Whether the vapors drawn forth by the power of his rays arise from the salt sea, the fresh lake, the muddy Nile, or the pestilential Niger, not a particle of these gross materials go up with them. Nothing ascends but the aqueous element in its purity.

This is a process, not only of vital importance to all organic existences, but one which exhibits a demonstration of infinite wisdom and power. For, to secure this result, the constitution of water, the action of solar heat, the properties of aqueous vapor, and the density of the atmosphere, have been so exactly and admirably adjusted to work together, that no room is left for doubt, that it is the arrangement of a Mind thoroughly conversant with all the properties of matter, and thoroughly familiar with the workings of all the laws which sustain and regulate the universe. A moment's reflection will make this manifest.

Let us suppose, for example, that only the solution of common salt, so largely diffused through all the oceans, were evaporated with the water. What, in such a case,

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*See Part III., Analogy 6.

would be the consequences? Why, every shower that descended would be a shower of *brine;* and this, if continued but for a short period, as is obvious, would prove the destruction of both all plants and animals on the dry land. As if to remind us, and to dispose us to appreciate the excellency of the existing arrangements of creation, certain aberrations of this kind have been suffered to take place, under certain extraordinary circumstances, and at distant intervals. "Saline rains have fallen during severe tempests; thus, in 1703, during an awful hurricane; and in September, 1821, in North America, saline particles were found upon the trees many miles from shore. Dalton, in conversation with M. Arago, communicated the fact, that in this country salt water had been detected in the rain-gauge, seven leagues from the coast, carried thither, doubtless, by the wind." *

Again: If only the solution of the sulphate of magnesia or Epsom salts were to be evaporated with water, consequences scarcely less deplorable would ensue; for then the water of every spring and well would soon be so strongly physiced for us as to be ruinous to health. Showers, whose water was tinctured with something of this nature, have actually been known to fall. On the 13th of November, 1755, a peculiar rain fell in part of Russia and Sweden; the water was acidulous, and cast down a flaky precipitate. And on the 27th of August, 1792, a shower whose water was mingled with cineritious substance fell at Paz, in Peru, which was followed by fevers and cerebral diseases.†

Or, again: If the mineral and vegetable solutions were evaporated with the water, we should have rain of various colors; so that every drop would leave a stain upon our persons, upon our linen, and upon whatever it fell; which,

* *Thomson's Meteorology*, p. 156. † Ibid., p. 154.

if not positively injurious, yet would be very inconvenient and annoying. Of this also, Nature has given a few illustrations. On the 15th of May, 1830, *red rain* fell at Sienna and in the neighborhood; the weather had been calm for two days previously, but the sky was overcast by dense reddish clouds. This rain, according to Professor Guili, contained carbonate of iron, manganese, silica, carbonate of lime, alumina, and some vegetable matter. On the 9th of June, 1835, during a thunderstorm, at Banff, a shower of *yellow rain* fell; the water of the pools in the neighborhood, and the lee-side of the river Deven, were tinged with the same hue. In Worcestershire, England, April 22d, 1846, a *black-colored rain* fell, for two hours together, and turned the Severn, and the waters in the vicinity of Dudley, Stourport, Abberley, and Bewdley into that color. Such facts render the evils of colored rain sufficiently obvious.

Once more: If all the mineral and vegetable solutions found in the waters of the earth were exhaled with them, and this compound vapor diffused through the firmament, not only would the character of the rain be changed, but the whole constitution of the atmosphere would be deranged—its density and pressure, its power for absorbing and radiating heat, its capacity for the transmission and reflection of light, together with its electric equilibrium, would all soon be disturbed to an extent that would produce results disastrous alike to man and beast. As serving to convey some idea of what probably would often happen in such an altered condition of things, we transcribe the following occurrence: "In November, 1819, remarkably dark and gloomy weather was experienced over the northern part of the United States and Canada. At times the aspect of the sky was grand and terrific. In Montreal the darkness was very great, particularly on the

morning of Sunday, the 19th; the whole atmosphere appeared as if covered with a thick haze of a dingy orange color, during which rain of an inky appearance fell. The weather after this became pleasant, until the Tuesday following, when, at twelve o'clock, a heavy, damp vapor enveloped the whole city, when it became necessary to light candles in all the houses. The appearance was awful, and grand in the extreme! A little before three o'clock, a slight shock of an earthquake was felt, accompanied with a noise resembling the distant discharge of artillery. It was now that the increasing gloom engrossed universal attention. At twenty minutes past three, when the darkness seemed to have reached its greatest depth, the whole city was instantaneously illuminated by the most vivid flash of lightning ever witnessed in Montreal, immediately followed by a peal of thunder, so loud and near as to shake the strongest buildings to their foundations, which was followed by other peals, and accompanied by a heavy shower of rain of the color above described. After four P. M., the heavens began to assume a brighter appearance, and fear gradually subsided." *

Such, in brief, would be the evils and inconveniences that would result from the general and indiscriminate evaporation of the waters as they exist upon the face of the globe. And who can duly consider these things, and not admire the excellency of the existing order and processes of nature. Who but must adore the wisdom of the Creator, who, foreseeing all the effects which could possibly arise from the properties and forces of matter, has effectually provided against such disasters, by arranging all things according to number, weight, and

* The writer would not be understood to intimate that the foregoing extraordinary occurrences resulted from any change in the action of the Sun; they were produced undoubtedly by certain local and limited disturbances belonging to the earth. The Sun has been undeviating in his agency from the beginning.

measure, so as to work out the results most suitable and most beneficial for the welfare of the world. Who can seriously contemplate the mighty and glorious Sun, as an engine of untiring and unremitting energies, distilling from the sea, and lake, and river the aqueous element in its purity, to supply the wants of man and beast, and to refresh and nourish all that live or grow upon the face of the earth,—but must find the sentiments and emotions of his heart expressed in the words of the sweet singer of Israel: "Great is the Lord, and greatly to be praised. He causeth the vapors to ascend from the ends of the earth; he sendeth the springs into the valleys, which run among the hills. They give drink to every beast of the field; the wild asses quench their thirst. By them the fowls of heaven are refreshed, which sing among the branches. He watereth the hills from his chambers, and the earth is satisfied with the fruit of his works."

## Teachings.

In scripture, *Waters* is the term used figuratively to signify peoples; and *Many waters*, on account of their tumultuous noise and agitation, to denote multitudes, nations, and tongues. Thus Jeremiah, in speaking of the invasion of Philistia by the vast armies of the Chaldeans, says, "Behold, waters rise up out of the north, and shall be an overflowing flood, and shall overflow the land, and all that is therein." The word is used and explained in the same sense in Revelation: "The waters which thou sawest are peoples, and multitudes, and nations, and tongues." Homer, also, has the same figure. As the waters cover the deep places of the sea, so the human race overspreads all the dry land. Moreover, as all the waters of the earth are contaminated, are more or less mingled with other and grosser matter, there being

no absolutely pure water on the face of the globe; so the whole human race is corrupted through sin. "They are all gone astray, and the way of peace have they not known." "They are together become unprofitable; there is none that doeth good." "There is no fear of God before their eyes." "There is not a just man upon earth, that doeth good and sinneth not."

Now, as the Sun of nature, in drawing upwards from the waters of the earth the vapors that are to form the fleecy clouds on high, separates and leaves behind every particle of the gross materials with which they had been connected;—*so the Sun of Righteousness, when he lifts the souls of his redeemed to the skies, divests them of all the corruption with which they had been affected in the body, so that they ascend pure and stainless to dwell forever in his presence.*

The mission of the Son of God into our world was to save his people from their sins, that he might redeem them from all iniquity, and purify unto himself a peculiar people. This process of purification and sanctification, under the influence of Divine grace, is carried on through the whole period of man's regenerated life; yet more or less of the defilement of sin, more or less of their native corruption, cleaves to them even to the last. But when, at the bidding of God, the earthly house of this tabernacle is dissolved, and he raises them to his own celestial abode, the old man, with all his affections and lusts, is left behind, and the disembodied spirit ascends without spot, or wrinkle, or any such thing. Its deliverance from sin is now final and complete. In heaven all are pure and holy. Nothing that defileth can enter there. As every drop of all the millions of tons of water drawn up annually by the Sun into the skies is pure and transparent as the crystal; so every soul of all the multitudes

lifted from every land by the Sun of Righteousness to the heavenly mansions, is holy as he is holy, and pure as he is pure. "They are without fault before the throne of God." Mount Zion, the city of the living God, is occupied by none other than "an innumerable company of angels, and *the spirits of just men* MADE PERFECT."

Clean delivered from sin, the people of God shall also, in the same hour, be fully and forever delivered from all the evils connected with sin. Nor toil, nor trial, nor temptation, nor trouble, nor pain, nor sorrow, nor doubt, nor fear, shall they ever know again. In that day "God shall wipe away all tears from their eyes; and there shall be no more death, neither sorrow, nor crying, neither shall there be any more pain: for the former things are passed away."

Why then should the Christian fear death? Why dread the hour which will restore him to the image of God, and introduce him to immortal blessedness? Is it not gain, infinite gain, to die?

"Death is the crown of life:
Were death denied, poor man would live in vain;
Were death denied, to live would not be life;
Were death denied, even fools might wish to die.
Death wounds to cure; we fall; we rise; we reign!
Spring from our fetters; fasten in the skies;
Where blooming Eden withers in our sight.
Death gives us more than was in Eden lost.
The king of terrors is the prince of peace."—*Young.*

# PART FOURTH.

## *THE SUN AS THE SOURCE OF ACTINISM, OR CHEMICAL POWER.*

### ANALOGY I.

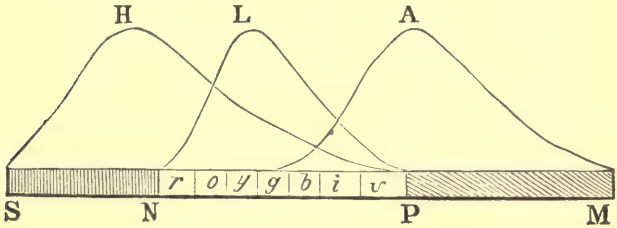
*As the beams of the Sun of Nature descend with threefold power, and not only illumine and heat but also work a change in the constitution of the substances upon which they fall;—so the beams of the Sun of Righteousness not only enlighten and warm but regenerate the soul into which they enter.*

#### PHENOMENA.

THE sunbeam, however slender, combines in its silvery thread three distinct sorts or species of rays; and these produce on the objects or substances upon which they fall three different effects. Two of these, light and heat, which have engaged our study in the preceding parts of this work, have been well known for thousands of years, even from the beginning; but the third was not discovered until towards the close of the last century, and has been successfully studied and applied to artistic purposes only within the last fifty years—this is its *actinic* or *chemical power*. This is as distinct from light and heat as light and heat are from each other. These three effects of the Sun may be illustrated by a familiar exam-

ple. The solar beam, falling upon the naked hand, illumines it, and so affects the sense of sight; it also warms it, and thus affects the sense of touch or general feeling; in addition to both these, it *tans* it, which is an effect not directly cognizable by either of those senses, but is a modification of the chemical condition of the substances composing the skin.

To make this power of the sunbeam plain to the uninitiated we must refer again to the solar spectrum. In the annexed figure, the band SM represents the whole extent of the spectrum, visible and invisible. The curved lines H, L, A, indicate the extent and intensity




INTENSITY OF HEAT, LIGHT AND ACTINISM.

of heat, light and actinism respectively. The part NP of the band, made up of the spaces marked *r*, *o*, *y*, *g*, *b*, *i*, *v*, (the initials of the seven colors) represents the light or visible portion of the spectrum; SN, that portion of the heat rays lying beyond the light rays, on the left; and PM, the actinic rays falling beyond the light rays, to the right. Now, if a thermometer be placed at S, and slowly moved toward the right, the mercury will rise as indicated by the curved line until it reaches H, its highest point; after this it will gradually sink, and, about the middle of *v*, return to the point or level from which it started. In a similar manner, beginning at N, the light gradually increases, and at L, attains its highest degree

of intensity; from thence it slowly declines, and at P becomes extinct. So with actinism, commencing about the middle of *g*, it increases rapidly until it reaches A, and from which it diminishes about as rapidly, and goes out at M. Thus the height of these three curves vertically above the spectrum indicates the relative intensity of the heat, light and actinism of the point in the spectrum immediately below. Both heat and actinism, it will be observed, attain their greatest intensity beyond, or outside of the light or visible portion of the spectrum. It will also be noticed that from S to N, there is heat only; that from P to M, there is actinic action only; while from N to P, the action of two, or of all three, are combined. Thus heat is associated with the red end of the spectrum, and parts beyond; chemical action with the violet end, and parts beyond; and light has its chief point of intensity lying in the yellow.

When a sunbeam, then, is received upon and passed through a prism, the *visible* spectrum marks only an interval of the rays that fall upon the screen or wall, namely, those which are so related to the nerve of vision as to excite in it the impression of light. Beyond this interval, *in both directions*, rays fall—invisible rays; those falling beyond the red being powerful to produce heat, while those falling beyond the violet are powerful to promote chemical action. These three different effects result from difference in the length of the waves produced in the ether, as described in a former chapter. The spectrum is to the eye what the scale of sounds is to the ear. All sound is produced by vibrations in the atmosphere, and all light by undulations in the luminiferous ether. Now the vibrations of a harp-string, or piano-cord, which are longer and slower than 16 to a second of time, cannot be heard; and, on the other hand,

those which are shorter and faster than 16,000 to the second cannot be heard. Vibrations, indeed, there are below the former and above the latter, but neither is competent to produce the sense of sound in the human ear, at least in its normal condition. So it is with the ether waves and the human eye; beyond the violet, these waves are too short and rapid to be visible; and beyond the red, in the opposite direction, they are too long and slow to be visible. "Both as regards light and sound, our organs of sight and hearing embrace a certain practical range, beyond which, on both sides, though the objective cause exists, our nerves cease to be influenced by it."

Though the actinic rays of the Sun are not perceptible to the eye, yet their existence is abundantly proved by their effects on various substances. If a photographic plate, that is, a plate having its surface coated with certain chemicals that are sensitive to the influence of the Sun's rays, be exposed to the operation of the spectrum, it is observed that red and yellow make only a very feeble impression upon it. Light blue produces more effect, but dark indigo and violet the most; and in the space where no rays can be perceived by our eyes, a distinct impression is produced, and extends beyond violet for a space almost as long as the visible part of the spectrum. And from this fact the existence of the ultra-violet, or actinic rays was ascertained.

Many of the chemical effects of the Sun's light are, and long have been, familiar. Linen and cotton cloth exposed to it, for a length of time, as is well known, will be bleached; and fabrics dyed of certain colors will be faded, or changed into a different shade. Yellow wax laid beneath the solar rays will be turned white; and the colorless horn silver, in a few minutes, changed into a violet tint. And so of many other substances.

The chemical action of the Sun is powerful to decompose the chlorides, bromides and iodides of gold, mercury, silver, and even platinum. Under its continuous operation, nitric acid, which is colorless, becomes yellow, and in part is deprived of its oxygen, and in part reduced to vapor; and similar effects take place in a great number of other oxidized compounds. Exposed to the solar light, chlorine and hydrogen will in an instant combine with explosive force, and form hydro-chloric acid. Bunsen and Roscoe have calculated that the power of the Sun, in this respect, is sufficient to transform a volume of chlorine and hydrogen gas enveloping the entire globe to the height of 114 feet, in a single minute of time.

But not to multiply particulars of this kind, a single experiment will suffice to convince the reader of the great chemical power of the Sun's rays. "If a solution of peroxalate of iron be kept in a dark place, or if it be exposed for hours together to a heat of 212° of Fahr., it does not undergo any sensible change in its physical properties, nor does it exhibit any phenomenon which may be considered as the result of any elementary action. If, however, it be exposed to the influence of solar light, in a glass vessel provided with a tube, the concentrated solution of oxalate of iron soon presents a very interesting phenomenon: in a short time the solution receiving the solar rays develops an infinite number of bubbles of gas, which rise in the liquor with increasing rapidity, and give the solution the appearance of a syrup undergoing strong fermentation. This ebullition always becomes stronger, and almost tumultuous, when an unpolished glass tube is immersed in it with a small piece of wood; the liquid itself is afterwards thrown into ascending and descending currents, becomes gradually yellowish, turbid, and eventually precipitates peroxalate of iron, in the

form of small brilliant crystals of a lemon-yellow color, gas continuing to evolve."* To this we may add another and a similar fact: "When a solution of platinum in nitro-muriatic acid is mixed with lime water, in the dark, no precipitation takes place; but if the mixture is exposed to sunshine, it instantly becomes milky, and a copious formation of a white precipitate takes place, which subsides quickly and is easily collected. The same takes place more slowly in cloudy daylight."† Facts such as these have led to many practical operations of great importance.

But we return to the more familiar effects of solar chemistry. If a piece of paper, or a finger, be dipped in lunar caustic, and then be exposed to the Sun, it will quickly turn black. If initial letters or names be written on linen with what is called indelible ink, they will be at first quite pale, but by a short exposure to the sunlight they turn dark. If a sheet of paper be plunged into a solution of common salt, then dried, and again be dipped into a solution of silver, it becomes so sensitive to the action of the sunrays, that ferns and leaves such as those represented in Fig. 1, placed upon it, and then exposed to the summer's Sun, the uncovered part of the paper will turn black, while that beneath the ferns and leaves will remain white, presenting an exact impress of the whole group, as in Fig. 2. Nothing can give a more beautiful picture of them; the light works through the slender leaves, but not through the thicker and more compact stems, and thus copies all, even to the minutest veins. This process has been turned to important practical purposes; it has been of great service, for example, in military operations, where it was necessary to make quickly a copy of some map of which there was only

* *Philosophical Magazine*, 2d Series. † *Ibid.*

one impression. If a duplicate had to be made with hand, it would require several days to accomplish it; nor would it then have been as correct as that printed by the Sun in the above manner.

It is by the chemical action of the Sun, as is well known, that the photographer brings forth his marvellous productions—productions which are not only of pleasing personal interest, but of the greatest practical value in art, science, and literature. By the simple action of the

Fig. 1. WREATHS COPIED BY THE SUN. Fig. 2.

sunrays upon certain substances overspreading the surface of metallic or paper tablets, he can obtain an accurate likeness of any person, place, or thing he may desire. In this way he is enabled to preserve for us the lineaments of those who have benefited their race by their learning, their skill or their bravery. By the agency of the very rays which illumine the countenance and reveal the brilliancy of the laughing eye and the charm of the roseate cheek, he can at once secure for us

a lifelike picture of the form and features we most admire and love. In the same manner he can copy the outlines and details of natural scenery with perfect fidelity. In his picture will be found every undulation of the landscape, every projecting rock, every sinuous stream, each spreading tree, each grazing ox, the peasant's home, the village spire, together with every other object and feature in the scene—these, all these, he can faithfully transfer to his plate, in all their varied and delicate shades, by the sole agency of the sunbeams which illuminate the whole.

The chemistry of the solar rays, in our day, has become a most important auxiliary to nearly every branch of human study or investigation. By its means the traveller is enabled to bring home accurate representations of the scenery, inhabitants, and productions he has witnessed in foreign climes; the geologist, to secure unerring delineations of the marvellous fossils of the flora and fauna he has discovered in the deep strata of the earth; the astronomer, to present the transient appearances of the eclipses he has observed in the heavens; the meteorologist, to furnish a correct registry of his barometer and thermometer through each hour, each minute of the day; the antiquarian, to obtain a fac-simile of the ruined temples, broken statuary, and obscured inscriptions which he has found on the fields of ancient civilization and power; the botanist, to copy with nature's exactness the forms and parts of plants, the stamens, and corolla, and pistils, and pollen of flowers; and the anatomist, to exhibit the various organs and functions of the body both in their normal and abnormal conditions.

As nothing is more general in its application, so nothing is more perfect and admirable in its execution, than the sunbeam. No object is too great, and none too

minute for it to depict. It can give us large pictures, with every detail perfect and in its right proportion, of the minutest objects, such as insects and animalcula; and it can furnish us with microscopic pictures, equally correct, of objects huge or vast. This is achieved by the intervention of lenses that magnify or diminish the image. Microscopic photography is of great importance in relation to anatomic preparations, which quickly change and become decomposed; it is also of very essential help in the study of fixed and permanent bodies. Jewelry, and even toys are sometimes made, containing minute photographs beneath small magnifying glasses. When these are held before the eye, small transparent images, some of them portraits, some statues, and others writings, come into view in admirable perfection. Such things, however, serve rather for amusement than use. But there are cases where microscopic photography may prove of no little value and importance. It has been suggested that in this way the contents of ponderous volumes might be concentrated within a few square inches, and the books of a whole library be reduced within the capacity of a single drawer. Though nothing of this sort, as far as the author is aware, has thus far been done, yet the process has been employed for other ends under most interesting circumstances.

Professor Hermann Vogel relates that, "during the siege of Paris, in 1870, the blockaded city held communication with the world outside by means of balloons and carrier pigeons. The first mode of communication was almost engrossed for political objects; the second only admitted the transmission of very minute writing. Letters, however condensed, could scarcely have been sent more than two or three at a time by a pigeon. In this case, microscopic photography presented a valuable

means of concentrating many pages on a collodion film of only one square inch, and of expediting more than a dozen of such almost imponderable films packed in one quill. Dagrand, at Paris, who first prepared microscopic photographs, also set going the system of these pigeon despatches. All the correspondence which had to be diminished was first set up in type, and printed together on a folio page. A microscopic photograph was made of this folio page, contained in about the space of 1½ square inches. This collodion film, with the image upon it, was then glazed over by pouring leather collodion over it; that is, collodion containing a solution of glycerine. This glucose collodion easily dries, separates from the picture, and forms a transparent film; a membrane of this kind could contain as many as fifteen hundred despatches. At the place of arrival these membranes were unrolled, and then enlarged by the help of a magic lantern; a number of writers thereupon set to work to copy the enlarged despatches, and ultimately forwarded them to their respective addresses. Thus Paris corresponded, by the aid of photography, for six months with the world without, and even poor persons were able to let their relatives know that they still lived."

Another marvellous fact pertaining to the chemistry of the solar rays is, the rapidity with which it produces its effects upon certain substances. A new negative process has lately been discovered; it consists in the use of a gelatine emulsion of silver bromide for the sensitive surface. With a plate thus prepared, a photograph may now be taken in *one second* of time which it formerly took thirty seconds to secure; and a plate can be prepared which needs an exposure of only one-sixtieth of a second, when a view is fairly lighted to secure a soft and harmonious negative. Thus it appears that solar rays are capable of

instantaneous chemical action, and of producing for us a perfect picture of a man in full activity, or of an object in rapid motion. The likeness of an orator may be taken at the moment of his highest pitch of eloquence, giving not only his attitude and gesticulation, but the very expression of his features. A squadron of cavalry can be pictured as they advance with rushing speed to the deadly charge, each man, each horse appearing a distinct figure in the scene. Nay, a view has been taken in which the shadow and reflection of a swallow passing in the air over a pond were perfectly represented. How wonderful the workings of the laws of nature! how closely related all its parts! how admirably constituted every ray of the Sun to move every atom of the earth to accomplish the purposes of him who worketh all in all!

We have now seen a variety of examples of the chemical action of the Sun on different substances, liquid and solid and gaseous, and the list might easily be extended; but suffice it to say, as Niepce long since asserted, that no substance, simple or compound, organic or inorganic, can be exposed to the solar rays without undergoing a chemical change. Actinism is one of the great and universal powers of creation, and is incessantly at work with all that covers the whole surface of the globe.

## Teachings.

The foregoing facts, illustrating the chemical action of the solar rays, are suggestive of much spiritual instruction. As the beams of the Sun of nature not only illumine and heat, but also, as we have just seen, work a change in the constitution of the substances upon which they fall: *so the beams of the Sun of Righteousness, the beams of his truth and gracious Spirit, not only enlighten and warm, but regenerate the soul into which they enter.* The points in this analogy are many and striking.

The influences of the sunbeam are various; it may both illumine and warm without producing any change in the substance upon which it falls, its chemical rays being deflected, as by a prism, or intercepted as by a plate of yellow glass, which is impervious to them. So divine truth may impart light to the mind, and stir up the emotions of the heart, and yet effect not the saving change, its power for this being frustrated by some carnal passion, or besetting sin. Herod heard John gladly, and Felix trembled as Paul reasoned of temperance, righteousness and judgment; but in neither did the word spoken effect a transformation from sin unto holiness. The seed that fell among thorns and that upon the stony ground both came to naught.

The chemical rays of the Sun are endowed with power to affect all earthly substances, of whatever nature, form, or magnitude. So the words of divine truth are fitted to influence men, and to renew them, of whatever position, talents, or character they may be—a Nicodemus in the Sanhedrim, a Cornelius in the army, a Peter in his fishing-boat, or a Lazarus in his beggary.

The actinic rays of the Sun are invisible to the human eye, and are known only by their effects. So the spiritual power with which divine truth is imbued cannot be seen by the eye of sense, but is known only by its fruits—making the sinful holy, the licentious pure, the vicious moral, the prayerless prayerful, the rebellious obedient, the angry and revengeful meek and mild and gentle.

As the chemical rays of the Sun, falling upon such substances as the solution of iron we have contemplated, set it as in fermenting activity, and transform it into glittering crystals—so the words of Christ, entering the heart, sets its emotions and affections in commotion, and change it into its own spirit. "The kingdom of heaven

is like unto leaven, which a woman took, and hid in three measures of meal, till the whole was leavened."

The sunbeams, as we have seen, affect some substances slowly, while upon others they produce their chemical effect almost instantaneously. So the words of divine grace; while in some minds they work a gradual change, in others produce a complete transformation as in a moment; the image of Christ, like the human face on the sensitized plate, being at once imprinted upon the soul, as in the case of Zaccheus the publican, and Paul the apostle.

As the chemical power of the Sun dissolves the bond of affinity which unites the elements of certain compound bodies, so that they are released and separated one from another; so the power of divine truth relaxes the soul's affinity for that which is evil and sinful, and sets it free to unite with that which is good and pure and holy. "The word of God is quick and powerful, and sharper than any two-edged sword, piercing to the dividing asunder of soul and spirit, and of the joints and marrow, and is a discerner of the thoughts and intents of the heart."

The chemical action of the sunrays, in connection with the dews of the morning, bleaches the dusky fabric to pure whiteness. So sin-stained souls "are sanctified by the washing of water and the word of truth." "Sanctify them through thy truth; thy word is truth," was the prayer of the Saviour.

As the solar chemistry proves itself an important auxiliary to every human study and pursuit: so the teachings of the Sun of Righteousness are of vital aid to man in all the vocations and duties of life, being "profitable for doctrine, for reproof, for correction, for instruction in righteousness, that the man of God may be perfect, thoroughly furnished unto all good works."

As the chemical rays of the Sun of nature give a true

picture of the landscape that lies before us, even to its minutest particulars and finest shades: so the beams of the Sun of Righteousness portray with truth and unerring fidelity the eternal scenes upon which we all are soon to enter.

Finally, these invisible rays of the Sun of nature offer important aid to our conception of, and strength to our faith in, the spiritual things revealed to us by the Sun of Righteousness. "When we remember that our organs of vision and hearing are capable of receiving impressions, either of light or sound, only when the rapidity of the undulations which cause them is comprised within certain very narrow limits; and when we recall the facts that there are waves of light and sound of which our dull senses take no cognizance; that there is a great difference even in human perceptivity; and that some men, more gifted than others, can see colors or hear sounds which are invisible or inaudible to the great bulk of mankind, you will appreciate how possible it is that there may be a world of spiritual existence around us—inhabiting this same globe, enjoying this same nature—of which we have no perception; that in fact the wonders of the New Jerusalem may be in our midst, and the songs of the angelic hosts filling the air with their celestial harmony, although unheard and unseen by us. Let me not be understood as implying that science has in any sense revealed to us a spiritual world, or that it gives the slightest shadow of support to those products of imposture, credulity, and superstition, which, under the name of witchcraft, mesmerism, or spiritualism, have in every age of the world deceived so many. The only revelation man has received of a spiritual existence is contained in the Bible; but modern science has rendered the conception of such an existence possible, and in this way has

removed a source of doubt. The materialist can no longer say that the spiritual world is inconceivable; for these discoveries show that it may be included in the very scheme of nature in which we live, and thus, although science may not remove the veil, it at least answers this cavil of materialism."*

## ANALOGY II.

*As the chemical action of the Sun varies with the progress of the seasons, to meet the varying requirements of vegetation from its germination to its maturity;—so the gracious influences of the Sun of Righteousness vary according to the wants and circumstances of his followers, from the day of their spiritual birth to that of their full fruition in the kingdom of glory.*

### Phenomena.

Matter, all matter, is endowed with certain properties, and these properties, by the Creator's will, are fixed and permanent. All its forces are uniform and invariable in their operations. Gravitation is a property of matter, and this acts always and everywhere according to the same rule. Chemical affinity is another property, and under its power combinations take place always and everywhere in the same exact proportions. In like manner, the forces of light and heat work always and everywhere after the same fixed and definite modes. Electricity and magnetism also operate always and everywhere in strict conformity to the same regulations. No investigation, no experiment, has ever detected one of these forces acting at variance with its established laws. But though these individual forces are thus invariable in their operations, yet the action of one may affect, may intensify or weaken, balance or neutralize, that of another;

* Cooke's *Religion of Chemistry*, p. 107.

and thus fixed laws may produce an endless variety of results. As a matter of fact, no *one* force determines any of the operations that take place in nature around us. Every product or operation that we witness is the result of different forces nicely balanced, and nicely modifying one another.

Now this is eminently true of the great forces of the sunlight, heat and actinism. While the action of each of these, as put forth by the solar orb, is uniformly the same, yet, as they come in contact or conflict with other forces, each is altered or modified in its action. In passing through the stratum of atmosphere which envelops our globe, composed of different gases and aqueous vapors, the light, the heat, and the chemical action of the sunbeam are each reduced in intensity, and that in proportion to the distance they have to travel through that atmosphere. Hence, this reduction is greatest when the distance is greatest; that is, when the Sun is in the horizon; and least when the distance is least; that is, when he is at the zenith, to any particular point of the earth's surface. And between these two points the reduction varies as his altitude varies with the hour of the day, or the season of the year.

It follows, hence, that the chemical effect of the sunlight is very feeble early in the morning and late in the afternoon; that it increases as the Sun rises above the horizon, and that it attains its greatest intensity about noon. For the same reason the chemical action of the Sun must be more intense on the summit of a high mountain than at its base, and this has been proved to be the case by actual experiments made on the Alps. The condition of the atmosphere, as being more or less obscured by clouds and vapors, also very sensibly affects the intensity of the solar chemistry.

As the altitude of the Sun, on any particular day and hour, varies according to the latitude of a place, it follows that his actinic power must vary in the same manner. At Berlin, latitude 52½° N., according to Bunsen, the chemical power of the sunlight for the different hours of the day, expressed in degrees, stands as follows:

| | 10 A. M. | 1 P. M. | 2 P. M. | 3 P. M. | 4 P. M. | 5 P. M. | 6 P. M. |
|---|---|---|---|---|---|---|---|
| Summer | 38° | 38° | 38° | 37° | 35° | 30° | 24° |
| Winter | 20° | 18° | 15° | 9° | 0° | 0° | 0° |

It will be observed from these figures that the chemical action of the Sun, in the winter, is comparatively feeble. It is also noticeable that in summer his chemical effect remains almost the same from 10 A. M. to 2 P. M., and that afterward it diminishes rapidly. For this reason photographers prefer this earlier portion of the day for taking their finest heliograph pictures.

When a beam of pure white sunlight falls upon any particular object, a flower, for example, its three several forces act conjointly and simultaneously upon it. But means have been discovered to sift them, that is, to intercept one while the others pass on to produce their natural effects. Glasses or fluids of various colors are found effectual to accomplish this. When a pencil of sunlight falls upon one of these, it will, according to its color, absorb certain of its rays while it will allow the others to pass through. The separation, however, is not complete, but approximate. This will be at once understood from a few results obtained with differently colored media. The following table exhibits the percentage of light rays, heat rays, and chemical rays transmitted respectively by the media whose names are given:

| | LIGHT. | HEAT. | ACTINISM. |
|---|---|---|---|
| Solution of Bichromate of Potash | 87 | 92 | 27 |
| Solution of Sulphate of Chromium | 85 | 92 | 7 |
| Blue Glasses | 40 | 72 | 90 |
| Solution of Sulphate of Copper | 60 | 54 | 93 |
| Solution of Ammoniate of Copper | 25 | 48 | 94 |

A glance at the above figures makes it very obvious that the action of the chemical rays will be obtained from the last three of these colored media, and the action of the luminous and heating rays from the first two, where the chemical rays are comparatively feeble.

To the above we may add that, yellow glass, or the yellow medium of chlorine gas, or the yellow solution of the sulphurate of calcium, will obstruct nearly all actinic or chemical action. Blue glass, or a blue solution, intercepts light, and transmits actinism. And the direct rays of the setting Sun, when passing through an atmosphere which reduces its light to a red or rich yellow color, produce no chemical change.

The various influences of sunlight on vegetable life have long been studied both by botanists and chemists. As long ago as 1835, M. Daubeny made a series of interesting experiments on the action of light by means of glasses and fluids of various colors. This curious subject has since been studied in a more general aspect by the philosophic Robert Hunt. Not content with ascertaining, as many of his predecessors had done, the action of the Sun's white and undecomposed light upon the germination and growth of plants, Professor Hunt availed himself of the discovery of the *invisible rays*, and sought to determine the peculiar influence of these, and of the various colored rays, upon the germination of seeds, the growth of wood, and the other functions of plants. He made arrangements by which he could submit living plants to an excess or deficiency of red, yellow, or blue rays; to an excess or deficiency of heating rays and of chemical rays. In this way he was enabled to study successfully the influence of these several rays, and to determine the peculiar action of each kind upon growing vegetation, from the germination of its seed to the maturity and ripening of its seed or fruit.

The general conclusions reached by Professor Hunt from his numerous experiments and protracted study on this subject, as given by himself, are the following: "The seed is placed in the soil; shade is always—absolute darkness sometimes—necessary for the success of the germinating process. We have seen that the first operation of nature is peculiarly a chemical one, but this manifestation of affinity is due to an exertion of force, which is directly dependent upon solar power. If seeds are placed under all the necessary conditions of warmth and moisture, but exposed to unmixed light, they will not germinate; but if we obstruct the luminous rays, allowing the chemical power to act, which is to be done by the interposition of blue glass, the birth of the young plant proceeds without any interruption. But let us take a truly natural example. The seed is buried in the soil, when the genial showers of spring, and the increasing temperature of the earth, furnish the required conditions for this chemistry of life; the plant eventually springs into sunshine. If, however, we place above the soil a yellow glass—which we have shown possesses the property of separating light from actinism or chemical power—and thus consequently insure the influence of only light and heat upon the soil, no seeds will germinate. If, on the contrary, a blue medium is employed, by which actinic power, freed from the interference of light, is rendered more active, germination takes place more readily than usual. Thus we obtain evidence that even through some depth of soil this peculiar solar power is efficient, and that under its excitement the first spring of life, in the germ, is effected.

"The cotyledons and the plumule being formed, the plant undergoes a remarkable change. The seed, like an animal, absorbed oxygen and exhaled carbonic acid; the first

leaves secrete carbon from carbonic acid inspired, and send forth, as useless to the plant, an excess of oxygen gas.

"Plants growing in the light are beautifully green, the intensity of coloring increasing with the brilliancy of the light. Those which are grown in the dark are etiolated, their tissues are weak and succulent, their leaves of a pale yellow. It is, therefore, evident that the formation of this chlorophylle—as the green coloring matter of leaves is called—results from some action determined by the Sun's rays.

"Chlorophylle is a carbonaceous compound, formed in the leaves, serving, it would appear, many purposes in the process of assimilation. This principle is effected in nature by the agency of light, *the luminous principle*, as distinguished from radiant heat, actinism, or electricity. That power which is most active in the development of the germ will not produce the excitement necessary for the decomposition of carbonic acid and the secretion of carbon; and under the influence of radiations which have permeated blue media, the plant grows in a succulent state, the formation of wood being exceedingly small. Of course, each of the elementary forces plays an important part in the progress of growth: every power of the solar beam is necessary: the light to excite the plant to decompose carbonic acid, and heat and actinism to produce the formation of many of the peculiar juices natural to the various species. Plants always turn towards the light: the guiding power we know not, but the evidence of some impulsive or attracting force is strong; and the purpose for which they are constituted to obey it is proved to be the dependence of vegetable existence upon luminous power.

"Light is not, however, alone sufficient to perfect the plant: another agent is required to aid in the production

of flowers and fruits, and this power is proved to be heat in some peculiar condition. Neither under the influence of the actinic or the luminous rays, as isolated by colored media, will the plant produce flowers; but having reached that point of development when the reproductive functions are, by another change in the chemical operations going on within the vegetable structure, to be called forth, it has been found that the heat-rays, as completely separated as it is possible for them to be by red media, become in a remarkable manner effective. It has also been observed that plants bend from the red, or calorific rays, instead of towards them, as they are found to do to every other ray of the spectrum. From this we may argue that the influence of these rays is to check the vegetative process, and thus to insure the perfection of the reproductive organs.

"Observations, which have been extended over many years, prove that, with the seasons, these solar powers are, relatively to each other, subject to an interesting change. In the spring, the *actinic power* prevails, and during this period its agency is required for the development of the germ. As the summer comes on, the actinic rays diminish, and those of *light* increase. We see the necessity for this, since luminous power is required for the secretion of the carbon, with which the woody fibre is formed, and also for the elaboration of the proximate principles of the plant. Autumn, the season of fruit, is characterized by an increase of *heat-rays*, and a diminution of the others: this change being necessary, as science now teaches us, for the due production of flower and fruit.

"The calorific rays of the solar beam, to which the autumnal phenomena of vegetation appear particularly to belong, are of a peculiar character; they exhibit a curious compound nature, and to distinguish them from

the purely calorific principle, they have been called the Parathermic rays. To these rays we may refer the ripening of fruit and grain, and the browning of the leaf before its fall."*

Such is the marvellous chemistry, varying with the progress of the year, which is carried on under the influence of the solar rays over the whole surface of the globe. And what an instance and illustration have we in it of the all-comprehending Intelligence that established this complete and efficient system of relations, affinities, and mutual influences, upon which depend the growth and fruitfulness, and even the very existence, of all the vegetable productions of our world! If the one thing which places the Human Being at the head of this earthly creation be his *intelligence;* and if only after the most laborious investigations and patient study intelligent man has been able to arrive at an imperfect understanding of these admirable chemical processes;—can any sane and candid person for one moment suppose, as the materialist would have us believe, that all this has resulted from mere blind—forces, forces possessing no trace of intelligence, no power of thinking, no faculty of combination, no idea of time or space? If the knowledge man has attained of the nature and operations of these agencies—Light, Heat, and Actinism—be reckoned, as it is, among the highest triumphs of his *intellect*, how can it consistently or possibly be denied that INTELLECT, that SUPREME INTELLIGENCE has been concerned in producing and combining them into this harmonious system of beautiful and beneficent operations?

"These, as they change, ALMIGHTY FATHER, these
Are but the varied GOD. The rolling year
Is full of Thee. Forth in the pleasing Spring
Thy beauty walks, Thy tenderness and love.

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* *Poetry of Science*, Chapter XIV.

Wide flush the fields; the softening air is balm;
Echo the mountains round: the forest smiles;
And every sense, and every heart is joy.
Then comes Thy glory in the Summer months,
With light and heat refulgent. Then thy Sun
Shoots full perfection through the swelling year.
Thy bounty shines in Autumn unconfin'd,
And spreads a common feast for all that lives.
And in Winter awful Thou!—
Mysterious round! what skill, what force divine,
Deep felt, in these appear! a simple train,
Yet so delightful mix'd, with such kind art,
Such beauty and beneficence combin'd;
Shade, unperceived, so softening into shade;
And all so forming an harmonious whole;
That, as they still succeed, they ravish still.
Soft roll your incense, herbs, and fruits, and flowers,
In mingled clouds to HIM; whose Sun exalts,
Whose breath perfumes you, and whose pencil paints.
Great source of day! best image here below
Of thy CREATOR, ever pouring wide,
From world to world, the vital ocean round,
On Nature write with every beam HIS praise."—*Thomson.*

## TEACHINGS.

As the chemical action of the Sun varies with the progress of the seasons, to meet the varying requirements of vegetation, from its germination to its maturity:—*so the gracious influences of the Sun of Righteousness vary according to the wants and circumstances of his followers, from the day of their spiritual birth to that of their full fruition in the kingdom of glory.*

The Great Teacher compares the growth of religion in the heart to the growth of a plant in the ground. "So is the kingdom of God, as if a man should cast seed into the ground, and the seed should spring and grow up—first the blade, then the ear, after that the full corn in the ear." In this parable, it will be observed, the life of the plant is divided into three stages—that of the blade, of the ear, and of the full corn in the ear. And these correspond in a remarkable manner to the three season changes, which science has shown to take place in the

action of the solar rays, by which the plant is carried on from its germination to its full maturity.

"And the seed should spring and grow up." The first impulse toward germination in the seed is given by the solar rays. Though the seed may have been cast into good soil, been properly covered, and have had all necessary moisture, yet without the genial influence of the Sun it will never germinate. So the word of God may be lodged in the mind or heart, and be favored with all needful advantages, yet without the gracious influence of the Sun of Righteousness it will never quicken into spiritual vitality. He imparts the first impulse towards newness of life. "You hath He quickened, who were dead in sin."

"First the blade." In the spring, when the blade is produced, the solar rays, predominantly active, are the *actinic* or chemical; and these are the rays which impart the precise stimulus which the plant requires at this incipient stage of its existence; as by their action water is decomposed into its gases and the starch of the seed is changed into sugar to nourish the developing embryo, thus enabling it to send upward its cotyledons in greenish leaves above the surface to breathe the air that is to set in activity all its future circulating processes. So with the seed of divine truth in the heart; the Sun of Righteousness sheds down those gracious influences which are most suitable to the sinner's condition—brings to bear upon his mind the spiritual stimulus which his helpless state requires—introduces thoughts and feelings he never knew before; directs his mind to God and eternity, to his own present situation and future destiny. Little by little he enables him to lift his head, so to speak, above ground, and gradually opens his eyes to see the light—to see his own sinfulness and peril, and then to see Christ

and his salvation. Presently his heart is drawn toward that precious Saviour, by a view of his glory, and of his love to poor sinners. And soon he begins to breathe towards him his desires in prayer; and in answer to these other and stronger impulses are given, which move and determine him to embrace Christ with all his heart. And thus all the processes of spiritual life are set in full activity. With all earnestness he now begins to resist sin, to engage in duty, to strive after holiness, and to honor God in his body and in his spirit, which are his.

"Then the ear"—the original means also the *stalk* with its spreading leaves. The growth of this is summer work; and as that season comes on, the *light* rays relatively increase, and become predominant in their action. And this is exactly the power necessary to enable the leaves to secrete from the atmosphere the carbon with which the woody fibre of the plant is formed, and also for the elaboration of the chlorophylle which gives to it its beautiful green color, and serves many other purposes in the process of assimilation. Thus under the increasing luminous action of the Sun, the structural formation of the plant finds the precise stimulus it requires in this second stage of its growth. So with the Christian in his second stage. The dispensations of grace toward him vary, in like manner, according to his day. The light of the Sun of Righteousness gathers strength upon his soul, upon his path, and upon his experience. In his first stage, his emotions and affections were specially wrought upon; in his second, these generally lose something of their keenness and intensity, but in the meantime his mind acquires increasing light. He gains a more correct understanding of the precepts and promises of scripture, more exalted and worthy views of the plan of salvation.

S. J. Ferris, del.

"PUT YE IN THE SICKLE, FOR THE HARVEST IS RIPE."

He comes to know more of God and himself. And the providence, that brings rains and storms as well as sunshine upon the plant, appoints for him also difficulties, and trials, not simply for the exercise of his graces, but to throw clearer light upon his own nature and real character—to reveal to him his remaining unbelief, pride, self-dependence, weakness, and inconstancy; to show him how little he can do for himself, and what great things God is able and willing to do for him. By a variety of such trials—by successes and disappointments, afflictions and deliverances, through the edifying influences of the Holy Spirit, he steadily acquires more light on the purposes of God, on the wisdom of his dispensations, and on the rich, sovereign, and abounding mercy of his covenant of grace. Thus, like the plant, under increasing light, the structure of his character attains strength, symmetry, and stability, and his profession the sweet verdancy which the beams of the Sun of Righteousness alone can impart.

"After that the full corn in the ear." As autumn approaches, the *heat* rays of the Sun, as we have seen, increase in their power. Of course each of the other forces plays an important part throughout the process of growth; every power of the solar beam is necessary all along; but now the warm rays gain the ascendency in their action. And this is in accordance with the requirements of the plant in its last stage. The influences which these supply are just what is necessary to fill up the ear—to give weight and solidity to each grain, and to perfect and ripen the whole for the waiting garner of the husbandman. And such are the gifts of grace which the Sun of Righteousness dispenses to the Christian in his last and closing stage. The warm beams which now descend upon him are ripening beams. His faith is strengthened,

settled, established; his love to God is purified and elevated; and his charity toward man is expanded to embrace friend and foe. His mind is disposed more and more to holy contemplation. Having had his views of the gospel, and of the Lord's faithfulness and mercy, confirmed by long experience, he rests in calm assurance, and in the comfort of a happy hope. He delights to meditate on the mystery of redeeming love; on the glorious excellency of the Lord Jesus, in his person, offices, grace and faithfulness; on the harmony and glory of the divine perfections; on the stability, fulness, grandeur and certainty of the divine promises; and on the heights, and depths, and lengths, and breadths of the love of God in Christ. And beholding thus his glory, he is changed into the same image, as from glory to glory. And now he has nothing which he cannot commit into his heavenly Father's hands, or which he is not habitually aiming to resign to his disposal. He sees that the time is short, lives upon the foretastes of glory, and therefore accounts not his life dear to him so that he may finish his course with joy. He has even a desire to depart and to be with Christ, which is far better. He stands as a shock of corn, fully ripe and ready for the garner of God.

# PART FIFTH.

## *THE SUN AS A MAGNETIC CENTRE.*

### ANALOGY.

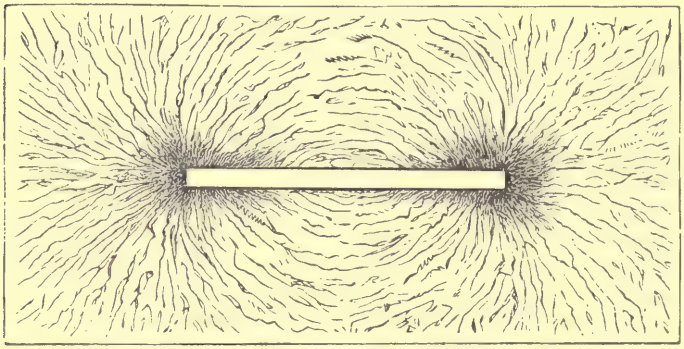
*As the globe of the earth is ever in magnetic sympathy with that of the Sun, —so the church, or body of believers, is ever in loving sympathy with Christ the Sun of Righteousness.*

#### PHENOMENA.

FROM very remote times, masses or lumps of a certain kind of iron ore were observed to possess the peculiar power of attracting other kinds of iron. This ore was found at an early date in the district of Magnesia, in Asia Minor; and from the name of that locality have been derived the terms *magnet* and *magnetism*. Both Lucretius and Pliny employ the word *magnes* to designate this singular power. We have also written evidence that it was known to both the Arabians and Chinese some time before the commencement of the Christian era. In Europe we find no mention of it made until the eleventh century. In the twelfth, it appears to have been turned to a practical purpose in the shape of some kind of mariner's compass. And in 1427, Vasco de Gama is said to

have employed such a compass, in an improved form, to pursue his adventurous exploration of the Indian Seas. From thenceforward this instrument became well known, and ere long, was in very general use.

This iron ore, sometimes called lodestone, or leading stone, is a brown mass, and in its general appearance differs little or nothing from other rude masses that may lie around it; but on trial, it is found, as just stated, to possess the power of drawing light particles of iron towards it. If this stone, or an artificial magnet produced by means of it, be placed upon a smooth surface, such as a pane of glass,



INFLUENCE OF A MAGNET ON IRON FILINGS.

and iron filings are thrown lightly around it, these filings will arrange themselves in regular and beautiful curves, proceeding from some one point of the mass to some other; and upon examination, we shall find that the iron which has once clung to the one point will be rejected by the other. The annexed figure will serve to illustrate this experiment.

Again: If this stone be freely suspended by a string, we shall discover that it always comes to rest in a certain position,—this position being determined by these points, and some attractive force residing in the earth itself.

These points are called its poles; and it is now established that this rude stone is a small representative of the globe upon which we live. Both the globe and the lump of ore are magnetic; and both are so in virtue of the circulation of currents or lines of magnetic force, as seen in the curves formed by the iron filings. This power exists permanently in the magnetic iron stones, and also in the earth; and the north pole of the one attracts the south pole of the other, and the contrary.

Magnetism may be induced in any bar of steel by rubbing it with a lodestone, and in other ways. This principle is not transferred but developed by the lodestone. By one magnet we may induce magnetism in any number of iron bars without losing any of its original force. And we may break the magnetised bar in two, and each of the parts will be found a perfect magnet still, having its own proper north and south pole, like the original bar. And each of these parts may be broken again with the same result; and so on without limit. There is, therefore, no transfer of magnetism: it is simply excited; both polarities exist at every point, and belong to every atom.

The nature of this mysterious agency is not understood. Some regard it as one of those modes of *molecular motion*, which are so difficult of investigation, and which we cannot here attempt to describe. Others hold it to be of the nature of electricity; and certain it is that there is an intimate connection between magnetism and electricity, so intimate that the former may for many reasons be considered as only a particular form in which the latter is developed. Magnetism, however, differs from electricity, as also from light and heat, in that it produces no direct effect on any of our senses. We know its effects only by the *motion* which we see it give to certain kinds of matter, such as steel or iron.

Magnetism, whatever its nature may be, is a universal force in the system of creation. "There is no substance," says Professor Hunt, "to be found in nature existing independently of magnetic power. But it influences bodies in different ways; some it attracts, and others it repels; in other words, one set acting with relation to magnetism, like iron, and arranging themselves along the line of magnetic force,—these are called *magnetic* bodies; another set, of which bismuth may be taken as the representative, always placing themselves at right angles to this line—these are called *dia-magnetic* bodies. Every substance in nature is in one or other of these conditions. The rocks, forming the crust of the earth, and the minerals which are discovered in them; the surface soil, which is by nature prepared as the fitting habitation of the vegetable world, and every tree, shrub, and herb which finds root therein, with their carbonaceous matter, in all its states of wood, leaf, flower, and fruit; the animal kingdom, from the lowest monad through the entire series up to man, have, all of them, distinct magnetic or dia-magnetic relations. Every particle of any substance found in this earth is endued with the property of disposing itself according to one or the other of these powers. It is become almost a certainty to us, that this stone of granite, with its curious arrangement of felspar, mica, and quartz, presents its peculiar condition in virtue of some such laws as that of dia-magnetism. The crystal, too, of quartz, which we break out of the mass, and which presents to us a beautifully regular figure, is, beyond a doubt, so formed, because the atoms of silica are each one impelled in obedience to one of these two forms of magnetism to set themselves in a certain order to each other, which cannot be altered by human force without destruction. That magnetism has such a directive power in the

formation of crystals has been proved by experiment."*

The same profound student of nature observes that it is probable many of the structural conditions of our planet are due to some polar action—such as the direction of mountain ranges, the cleavage planes of rocks, and the deposit of metalliferous ores. "On examining any mineral vein," says he, "it will be at once apparent that every particle of ore, and every crystal of quartz or limestone, is disposed in a direction which indicates the exercise of some powerful directive agency."

And magnetic phenomena are not limited to mineral and metallic substances, but extend to all material bodies, organic as well as inorganic. The leaf, the flower, and the fruit of a tree; the flesh and bones and blood of an animal, possess the power of repelling a suspended magnet, and of placing it at right angles to the direction of the force excited by them. Even the gases and vapors which compose our atmosphere are found to hold magnetic or dia-magnetic relations to one another. Such is the all-pervading character of magnetism,—

> "That power which, like a potent spirit, guides
> The sea-wide wanderers over distant tides,
> Inspiring confidence where'er they roam,
> By indicating still the pathway home;—
> Through nature, quickened by the solar beam,
> Invests each atom with a force supreme,
> Directs the caverned crystal in its birth,
> And frames the mightiest mountains of the earth;
> Each leaf and flower by its strong law restrains,
> And man, the monarch, binds in iron chains."

The earth upon which we dwell, then, is a great magnet afloat in the voids of space. And the point we are specially concerned to prove in the present analogy is, that this globe is in perpetual magnetic sympathy with

* See *Poetry of Science*, Chap. X.

that vastly greater magnet, the globe of the Sun. This is the conclusion to which the profoundest students of this subject have been brought. "It is most natural," says Hansteen, "to seek the origin of magnetic phenomena in the Sun, the source of all living activity." And Sir David Brewster, speaking to this point, makes this statement: "All our terrestrial magnetic phenomena have a direct reference to the Sun; but whether that orb acts by its heat, or by its light, or by specific rays, or influences of a magnetic nature, must be left to future inquiry." The same view, substantially, is set forth by Professor Hunt: "When we consider the phenomena of terrestrial magnetism carefully, it appears to indicate the action of a power external to the earth itself, and having its origin in the action of the Sun, heating, illuminating, and producing a magnetic tension."

In support of this conclusion, many facts may be adduced. Morichini and others state that bars of steel exposed to the violet rays of the Sun are rendered magnetic.

The diurnal and annual oscillations of the compass needle are regarded as very decisive indications of the magnetic influence of the Sun upon our globe. The needle exhibits each day two small oscillations from its mean position, namely, one towards the east and the other towards the west, according to the position of the Sun. These vibrations, when rightly understood, clearly indicate a sort of effort on the part of the needle to turn toward the Sun. Add to this, that this vibration is increased in summer and diminished in winter, as the Sun approaches or recedes.

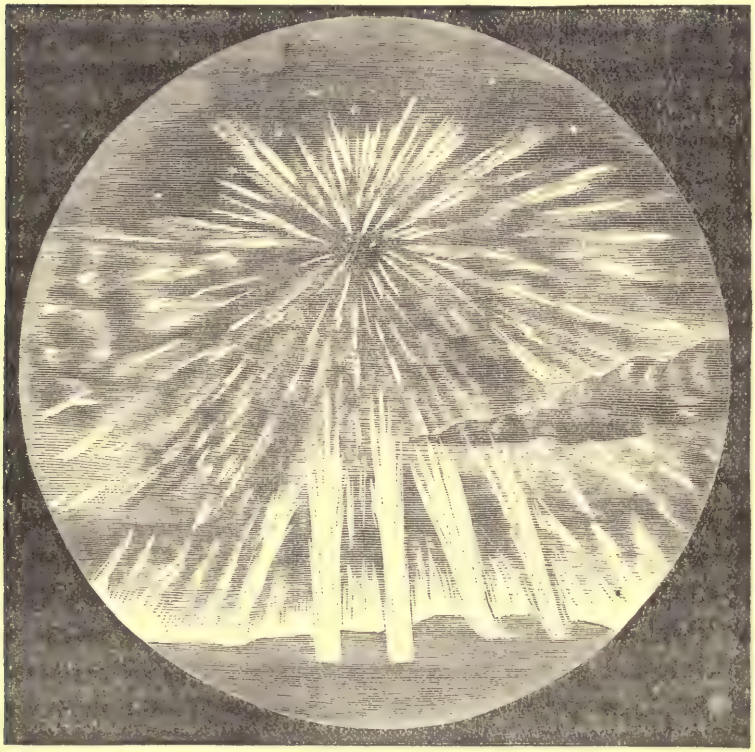
Again: the energy, or degree of force, with which the needle seeks its position of rest, varies with the varying distance of the earth from the Sun in its annual circuit.

About the end of December, when the earth is at its nearest distance from the Sun, this energy is greatest; and about the end of June, when it is at its greatest distance, the energy is least—the magnetic force, like that of gravitation, light and heat, varying inversely as the square of the distance.

Again: the needle has been found to oscillate through a longer cycle of changes, one occupying in its completion a little more than eleven years: that is to say, between the time when the oscillation is least and that when it is greatest there elapses a period of five and a half years, and an equal period before it returns again to its first value. Now, a cycle of changes takes place on the face of the Sun agreeing most perfectly with this, not merely in length, but in maximum for maximum, and minimum for minimum. To make this clear, the nature of the facts involved must be stated, and this can be done in no better words than those of Sir John Herschel: "One of the first achievements of the telescope was the discovery of black spots on the surface of the Sun. These spots are not permanent, but come and go; and their number varies greatly. Sometimes his face is quite spotless; at others, the spots swarm upon it. And as to their actual size, some are comparatively small, others of stupendous extent. One spot which I measured, in 1837, occupied no less than 3,780,000,000 square miles; another, which was nearly round, would have allowed the earth to drop through it, leaving a thousand miles clear of contact on every side; and many instances of much larger spots than these are on record. What are we to think, then, of the awful scale of hurricane and turmoil and fiery tempest which can in a few days totally change the form of such a region, break it up into distinct parts—open up great abysses in one part, such as I have just described, and fill up others beside them!

"Now it has lately been ascertained by a careful comparison of all the recorded observations of the spots, that the periods of their scarcity and abundance succeed one another at regular intervals of a trifle more than five years and a-half: so that in eleven years and one-tenth, or nine times in a century, the Sun passes through all its states of purity and spottiness. Thus for instance, in the present century, the years 1800, 1811, 1822, 1833, 1844, 1855–6 were years in which the Sun exhibited few or no spots; while in the years 1805, 1816, 1827, 1838, 1849, 1860, the spots have been remarkably abundant and large. Now there are two classes of phenomena or facts which occur here on earth which stand in very singular accordance with the appearance and disappearance of the Sun's spots. The first is that splendid and beautiful appearance in the sky which we call the Aurora or Northern Lights; and which, by comparison of the recorded displays, have been ascertained to be much more frequent in the years when the spots are abundant, and extremely rare in those years when the Sun is free from spots. The other is a class of facts not so obvious to common observation, but of very great importance to us; because it is connected with the history and theory of the mariner's compass, and with the magnetism of the earth, which we all know to be the cause of the compass needle pointing to the north. But besides this (the oscillations already described), the needle is subject to irregular, sudden, and capricious variations—jerking, as it were, aside, and oscillating backwards and forwards without any visible cause of disturbance. And, what is still more strange; these disturbances and jerks sometimes go on for many hours and even days, and often at the same instant of time, over very large regions of the globe; and in some remarkable instances, over the whole

earth—the same jerks and jumps occurring at the same moments of time (allowance made for the difference of longitude). These occurrences are called Magnetic Storms, and they invariably accompany great displays of the Aurora; and are very much more frequent when the Sun is



AURORA BOREALIS.

most spotted, and rarely or never witnessed in the years of few spots.

"The last four years (1858–1861) have been remarkable for spots; and there occurred on the 1st of September, 1859, an appearance on the Sun which may be considered an epoch, if not in the Sun's history, at least in our

knowledge of it. On that day great spots were exhibited; and two observers, far apart and unknown to each other, were viewing them with powerful telescopes; when suddenly, at the same moment of time, both saw a strikingly brilliant luminous appearance, like a cloud of light far brighter than the general surface of the Sun, break out in the immediate neighborhood of one of the spots, and sweep *across* and *beside* it. It occupied about five minutes in its passage, and in that time travelled over a space on the Sun's surface which could not be estimated at less than 35,000 miles.

"A magnetic storm was in progress at the time. From the 28th of August, to the 4th of September, many indications showed the earth to have been in a perfect convulsion of electro-magnetism. When one of the observers I have mentioned had registered his observation, he bethought himself of sending to Kew, where there are self-registering magnetic instruments always at work, recording by photography at every instant of the twenty-four hours the positions of three magnetic needles differently arranged. On examining the record for that day, it was found that at that very moment of time (as if the influence had arrived with the light) all three had made a strongly marked jerk from their former positions. By degrees, accounts began to pour in of great Auroras seen on the nights of those days; not only in these latitudes, but at Rome; in the West Indies, on the tropics within 18° of the equator (where they hardly ever appear); nay, what is still more striking, in South America, and in Australia; where, at Melbourne, on the night of the 2d of September, the greatest Aurora ever seen there made its appearance. These Auroras were accompanied with unusually great electro-magnetic disturbances in every part of the world. In many places the telegraphic

wires struck work. They had too many private messages of their own to convey. At Washington and Philadelphia, in America, the telegraph signal-men received severe electric shocks. At a station in Norway the telegraphic apparatus was set on fire; and at Boston, in North America, a flame of fire followed the pen of Bain's electric telegraph, which, as all know, writes down the message upon chemically prepared papers."*

Here, then, let us pause and recall the evidences now given that the globe we inhabit is in perpetual magnetic sympathy with that of the Sun. 1. We have seen that certain solar rays will render a bar of steel exposed to them *magnetic*. 2. That the compass needle exhibits daily oscillations that clearly indicate an effort to turn towards the Sun in whatever quarter he may lie. 3. That the energy with which the needle seeks its position of rest is, like that of the other great forces of nature, inversely as the square of the earth's distance from the Sun. 4. That the vibrations of the needle undergo a cycle of variations, running through a period of eleven years, which corresponds exactly with a cycle of changes upon the solar surface, not only in length of time, but also in maximum for maximum and minimum for minimum. 5. That the Auroral displays in our heavens, which are of magnetic origin, observe a similar correspondence in prevalence or scarcity with the prevalence or scarcity of these spots on the Sun. 6. That extraordinary perturbations in the gaseous envelops of the Sun are marked to us by extraordinary perturbations in the magnetism of the earth, amounting to what have been rightly named Magnetic Storms. All these long-observed and well-established facts afford, in the concurrent judgment of philosophers, a demonstration that there exists a bond

* *Familiar Lectures on Scientific Subjects*, No. 2.

of magnetic sympathy between our globe and that of the Sun; and that no changes or commotions can affect the solar photosphere without affecting the earth to a greater or lesser degree. From that primary and central orb, magnetic impulses, like the waves of light, perpetually speed in their outward flight to lave, and influence, and often thrill all its encircling planets, and to work on them and through them, as they do for the earth, a thousand diverse results essential to the purposes which they subserve in the great empire of the Creator and Lord of all.

The universal existence of gravitation and light, and the uniform laws according to which they act, clearly traceable to the utmost limit of observation possible to man, are justly regarded as certain evidences of the unity and one origin of the vast creation. And in this magnetic influence of the Sun, exerted every instant, and flowing outward upon all its dependent planets and satellites, we have another important bond of union between the orbs composing the mighty universe, and another proof that they are the product of *one* almighty and creative MIND.

TEACHINGS.

As the globe of the earth is ever in magnetic sympathy with that of the Sun,—*so the church, or body of believers, is ever in loving sympathy with Christ the Sun of Righteousness.*

The earth, as a globe, is susceptible to the magnetic influence of the Sun in virtue of the fact that it is composed of particles of matter in a magnetic state (differing according to their physical conditions); and the magnetic force of the whole, as a mass, is but the collective action of its atoms. So the church, as a body, is alive to the gracious impulses of the Sun of Righteousness, because it is composed of individuals, every one of whom is imbued

with his Spirit, and that self-same Spirit actuates all, governs all.*

The Christian as an individual, and the church militant as a body, are in perfect sympathy with Christ in all things that pertain to the glory of God and the salvation of men. In all this, every emotion and affection that swells the Saviour's bosom awakens its responsive emotion and affection in the hearts of all his people.

Is Christ pained and made sad in view of the impenitency and unbelief of men, "being grieved at the hardness of their hearts?" So grieve his true disciples in view of the same: "Am not I grieved," saith the man of God, "at them that rise up against thee?" And Paul, seeing the city of Athens altogether given to idolatry, felt his whole "spirit stirred within him."

Does Christ shed tears of compassion over the folly and misery of sinful men? Did he, "when he beheld the city, weep over it?" So weep his true followers also: "Rivers of water," saith the Psalmist, "flow down mine eyes because they keep not thy laws." And the apostle, "Many walk, of whom I have told you often, and now tell you even weeping, that they are the enemies of the cross of Christ."

Does Jesus rejoice at the conversion and return of the ungodly, as the shepherd on finding his stray sheep, and as the father on receiving his repentant prodigal? So rejoice they that are his: "For what is our hope, or joy, or crown of rejoicing? Are not even ye in the presence of our Lord Jesus Christ, at his coming? For ye are our glory and joy." "I have no greater joy than to hear that my children walk in the truth."

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* The word "Church" is here used to designate the body of *true believers*, or *the saint of God*, throughout the world, and not any particular society, or denomination of societies, where the wheat and tares are often mixed together.

Is it the will of Christ that his "Gospel should be preached to every creature?" In this likewise his church is in full sympathy with him. No sooner was this command issued than we read that "the disciples were scattered abroad and went everywhere preaching the word." And at this very day, behold his missionary servants going forth to every continent and island, sailing over every ocean, and threading every river of the globe, on the same embassy of love and mercy. And no tidings fall on the ears of those, whose duty it is to labor at home, that inspire greater joy than those of the progress and triumph of that Gospel in the world.

When the solar sphere is in commotion and sends forth its waves of magnetic influence, our whole planet is roused, and vibrates in responsive currents from its northern to its southern pole. So when the Sun of Righteousness is moved with compassion, and sends down in gracious effusions the influences of his Holy Spirit, the church is quickened, and thrilled through her whole membership with sacred joy and gladness; and, as in the former event, the Aurora shoots upward its luminous beams to adorn the firmament; so, in the latter, his people's thanksgiving and praise ascend as clouds of incense before the eternal Throne.

He who is a stranger to this *sympathy* is an equal stranger to Christ; "for, if any man have not the spirit of Jesus, he is none of his."

# PART SIXTH.

## *THE SUN AS THE CENTRE OF GRAVITATION.*

### ANALOGY I.

*As the Sun's gravitation is the ruling force that continues the revolutions and ensures the safety of the planetary system;—so the love of the Sun of Righteousness is the efficient power that perpetuates the activity and guaranties the safety of the Church.*

#### PHENOMENA.

THE solar system, that province of the universe to which our world belongs, may be regarded as a lonely cluster of glittering islands on the bosom of the boundless ocean of immensity. A *lonely* cluster, I say, for there is no other cluster, no other system, no other star, within a radius of 20,000,000,000,000 miles—a distance so great that, had it been possible for one of our swiftest steamers to sail on that ocean, and had set out on the day of Adam's creation to traverse it, and had continued its progress without intermission from that day to this, it would not have yet accomplished the *one*-twenty-five-thousandth part of that distance. Our system is surrounded by a solitude that is practically infinite to puny man!

Of this system, as all know, the Sun is the centre. Around him revolve more than two hundred planetary globes, differing in size from fifty miles to 85,000 miles in diameter; moving at distances varying from 37,000,-

000 to 2,800,000,000 of miles; flying through space at rates from 11,000 miles to 105,000 miles per hour; and accomplishing their circuits in periods varying from three months to 165 years. To a few of the larger class of these planets belong a number of satellites or moons, each a world in itself: of these, the Earth has one, Mars two, Jupiter four, Saturn eight, Uranus four, and Neptune one. These satellites follow and spin around their respective planets as they accomplish their mighty circuits, thus performing a two-fold revolution, one around the planet as their primary centre, and the other with the planet around the Sun, the common centre of all. Such, in brief, is the solar system.

Now, numerous as are the globes composing this system, complicated as are their movements, and fearful as are the velocities with which they career through space, yet perfect order and entire safety prevail throughout the whole; each globe retains its appointed orbit, and accomplishes its vast round in exactly the same period from age to age, and from century to century. And how is this undeviating regularity maintained? By what energy are these motions perpetuated and controlled? By what power is the safety of this vast celestial machinery secured? This system—these globes, as they were launched forth from the hand of Omnipotence, were committed, so to speak, to the control and governance of the power called *Gravitation;* and this, through all the æons of the past, has firmly held each in its place, brought forward each in its time, and preserved all in harmony and security, as they are seen at this day.

But to speak more definitely. This gravitation, or the power which matter has of attracting matter, is a universal force. It belongs to, or rather, it is possessed by every particle of matter in the universe, whether solid, liquid,

or aeriform. The attracting force of matter may be compared to that of the lodestone whereby it draws the iron filings to itself. Every body of matter, and even every particle, thus attracts every other body and particle. It is the earth's attraction that brings down the apple from the tree, and the rain-drop from the cloud. What renders it difficult to remove the block of granite, that lies before us, is simply the gravitating force with which the earth draws it downwards to its bosom. The *weight* of any material or substance—of a bushel of wheat, of a leg of mutton, or of a gallon of water, is only the measure of the earth's attracting force upon it. The gravitating power of any body or object, of a boulder or a planet, for example, is in proportion to the amount of matter it contains; or, to employ the scientific term, in proportion to its *mass*. The greater the mass the greater the attraction; that is, twice the mass gives twice the attraction, and three times the mass three times the attraction, and so on. Now the mass of the Sun is over 300,000 times greater than that of the earth, and more than 700 times greater than that of all the other globes of the system put together. Hence we see his superior and controlling power over every member of his planetary family.

We are now prepared to speak of the action of the Sun's gravitation on the movements and conservation of the system. The uniform and perpetual motions of the planets result from two forces: the one, the *original impulse* given to each globe, however imparted, whose tendency was to carry it forward in a straight line through space; the other, the *attracting power* of the Sun at every instant of time and every inch of its progress, drawing it inward toward himself, and thus changing the planet's onward course into a curve, and at the end of a complete revolution bringing it back to the same point from which

it started; and all this to pursue the same round again. In this way, by the force of gravitation, every globe in the system is carried round in its orbit.

The power thus exerted by the Sun is very great; some idea of it may be gained by considering what an amount of force it must require to turn from its course a globe of the stupendous weight of the earth, set in motion and flying forward at the rate of nineteen miles per second, a velocity more than a thousand times that of the fastest locomotive.

If the attraction of the Sun were reduced or lessened, the orbit of every planet would change its form, and the safety of the whole system would be endangered. If his attraction were altogether extinguished or annihilated, all its revolutionary motions would immediately cease, and each planet would forsake its orbit, and fly forward in a straight course in the direction in which it was moving at the instant of such annihilation, and thus plunge into the empty void never to return. This may be illustrated by a simple experiment. If a leaden ball be rapidly whirled round at the end of a string, the ball in motion will represent a planet revolving in its orbit, and the string that compels it to describe a circle through the air will represent the Sun's attractive force on that planet. Now, let the string snap, and from that instant the ball will cease to move in a circle, and will fly forward in a straight line, as does a stone when let loose from the sling. So, the moment the Sun's gravitating force should be extinguished, each planet would rush forward in a straight course, and the whole system would be scattered through the voids of space. It is obvious, therefore, that the Sun's gravitation is the ruling power that perpetuates the motions and preserves the safety of this whole system of creation.

Now, the action of gravitation is governed by one universal law, and that law is this: *The force with which two globes or two particles of matter, respectively attract each other, is directly in proportion to their masses, and inversely proportional to the square of the distances between their centres.* The former part of this law, from what has already been stated, is sufficiently plain; but the latter may need a word of explanation. If the distances of two bodies be indicated by the first line of figures below, their mutual force of attraction, at those distances, will be respectively expressed in the second line:

| | | | | | |
|---|---|---|---|---|---|
| 1, | 2, | 3, | 4, | 5, | 6, etc. |
| 1, | $\frac{1}{4}$, | $\frac{1}{9}$, | $\frac{1}{16}$, | $\frac{1}{25}$, | $\frac{1}{36}$, etc. |

In other words, if the Sun attracts the earth at its present distance with a certain amount of force, at twice that distance his force would be but one-fourth as great; at three times the distance only one-ninth; and so on. Gravitation acts according to this law undeviatingly, alike in regard to the mightiest globes and the minutest particles, throughout the universe. There is no discovery or deduction of science more satisfactorily established than this law.

Here then a most interesting question suggests itself—Why should gravitation follow this peculiar and unique law? How came it into action, and universal action? There is nothing in the *nature* of gravitation, so far as we know, to bind it to this, or to any other particular law, to the exclusion of all others. On the contrary, it might have acted according to a hundred other and different laws. Instead of inversely as the squares, it might have diminished inversely as the cubes, or inversely as the fourth, or any other higher power: or, it might have decreased in force directly and simply as the distance, and

that after any arithmetical ratio. Or, instead of diminishing, it might have increased as the squares or the cubes of the distances: or it might have increased directly and simply as the distance, and this in any proportion. In short, an infinite number of laws was possible to it. How then came the existing law to prevail and be established? Was it by chance, or by choice? Let us consider the facts involved, and leave these to decide the question.

If gravitation had varied—that is, increased according to any *direct* law of the distance, let it have been what it might—confusion and speedy destruction would have ensued. For, first, the mutual attraction of the planets themselves, in that case, would have perpetually changed the form and dimensions of one another's orbits, a disturbance that would have been productive of incalculable evils. Add to this that, under such a law, the gravity of bodies at the earth's surface would have ceased to exist. No substance would have any weight; nothing would press or fall downwards. The attraction of the vast orb of the Sun and of the great planets, pulling in proportion to their immense distances, would have neutralized that of the earth. All terrestrial things would have floated about, as it were, without any principle of coherence or firmness, and all terrestrial animals would have tottered along without any power or feeling of stability. The material system of creation, indeed, would have subsisted had gravitation been governed by a direct law, but it would have been a scene of disorder and insecurity, and altogether unfitted to be the abode of sentient or organized existences.

Let us now consider what would have resulted from *inverse* laws. If gravitation had decreased inversely as the cubes, to wit, after the series, 1, $\frac{1}{8}$, $\frac{1}{27}$, $\frac{1}{64}$, $\frac{1}{125}$, etc.; that is, one-eighth at double the distance, one-twenty-

seventh at three times the distance, and so on; or, if it had decreased inversely after any other higher power, the consequence would have been that the planets, if they once began, as sometimes they must have through mutual attraction, to approach the Sun, they would have approached him nearer and nearer, until they would have fallen upon him; or, if they once began, as at other times they must have through the same cause, to increase their distance from him, they would have forever receded from him. Or to borrow the language of a distinguished mathematician, "Under such laws, it would follow, that a planet would describe a spiral line about the Sun, and would either approach nearer to him perpetually, or perpetually go further off: nearly as a stone at the end of a string, when the string is whirled round, and is allowed to wrap round the hand, or to unwrap from it, approaches to or recedes from the hand." All reciprocal ratios, therefore, except what lie beneath the cube of the distance, were unfit and incapable of preserving the harmony and securing the safety of the system.

The laws of attraction, therefore, by which a system of revolving bodies, like the planets, could be preserved in harmonious motion, lie within very narrow limits, compared with the possible laws—lie within the space of an inch as compared to a mile. Here, then, is strong evidence of *foresight* and *choice*.

But this is not all. Let us now look at the specific and striking advantages attending the existing law above every other law, whether direct or inverse. First, under this law, the attraction of a particle and that of a globe are subject to the same rule, a point of the utmost importance in the regulation of the system, but one that could be secured by no other law. Second, by the existing law, what are called the *apsides*, or the points in a planet's

orbit where it is at its greatest and least distance from the Sun, are fixed; which is another matter of vital moment. To make this plain, the earth, for example, describes an ellipse in her annual revolution; in consequence of which motion she is nearer to the Sun in our winter than in our summer by about three millions of miles. And under the action of the existing law of gravitation, the nearest approach to the Sun, and the furthest recess from him, occur always at the same points of the orbit. Now, if the gravitating force had followed any other law, the earth would have been running perpetually on a new track. The greatest and least distances would have occurred at different parts in every successive revolution; and, as a consequence, the regular recurrence of the seasons would have been impossible. Third, the present law confines the unavoidable perturbations, arising from the planets' mutual attractions, within safe limits. It will not allow these perturbations to run into destructive or even dangerous lengths, but so balances them as to render them mere periodical oscillations; that is, when they have gradually reached a certain degree in one direction, they as gradually go back in the opposite direction, and then return as before. This can be demonstrated of the existing law, but of no other law whatever.

Here, then, is another class of decisive evidences that the law which we find governing the universe came into action, not by chance, but by *choice*—the choice of an INTELLIGENCE that could clearly foresee the results of all possible laws; and foreseeing them, established the best.

## TEACHINGS.

He who with a devout mind contemplates the potent and mysterious workings of the force of gravitation, in

the world of matter, will see in them most striking and instructive illustrations of the far more mysterious and effective power that is operating and controlling all, in the world of mind. He will discover that there is such a similarity of action characterizing the natural and the spiritual, that he shall be able to read the Gospel in the laws obeyed by the stars, by the earth, and the things that are in the earth, as upon the printed page. He will find that the same principle runs through things spiritual as through things natural. "The invisible things of God since the creation of the world are clearly seen, being perceived through the things that are made, even his everlasting power and divinity." The God of creation is the God of the Gospel. "I look on the natural firmament with its glorious inlay of stars," says an eloquent writer; "and it is unto me as the breastplate of the Great High Priest, ardent with gems oracular, from which, as from the urim and thummim on Aaron's ephod, come messages full of divinity. And when I turn to the page of Scripture, and perceive the nicest resemblance between the characters in which this page is written, and those which glitter before me in the crowded concave, I feel that, in trusting myself to the declarations of the Bible, I cling to him who speaks to me from every point, and by every splendor of the visible universe, whose voice is in the marchings of the planets, and the rushing of whose melodies is in the wings of the daylight."

As the Sun's gravitation is the ruling force that continues the revolutions and ensures the safety of the planetary system; *so the love of the Sun of Righteousness is the efficient power that perpetuates the activity and guaranties the safety of the church.* This is the general lesson suggested by the interesting subject which has now been before us; but let us descend to particulars.

As it is not the planet's attraction upon the Sun, but the Sun's attraction upon the planet, that draws it into its appointed orbit, and that carries it safely and uniformly round from year to year; so it is not by any native power, or disposition of his own, that any sinful man is drawn into the orbit of his duty and allegiance to God, and that he continues to pursue it, but in virtue of the attracting love and guiding grace of the Sun of Righteousness. He is brought and kept in the path of life, not by his apprehending of Christ, but by his being apprehended of him. "No man cometh to me except the Father *draw* him." If any man finds himself in the narrow way, and advancing in it, he owes it entirely to the grace of Christ going *before*—before any good efforts or desires of his own—imparting light, impressing truth, and urging him to duty and to God. It is after this, and in consequence of it, that the sinner's own powers are awakened into activity, and that he runs with patience the race that is set before him. The heavenward motion begins with God, and not with man.

Again: As the planet's safety is perpetually dependent upon the Sun's controlling action, so the Christian's security is every day, every hour, dependent on the attracting love and guiding care of the Sun of Righteousness. Left to himself, left to his own centrifugal tendencies, like a planet cut loose from the bond of gravitation, he would immediately forsake the right way, and plunge into darkness and destruction. He would become, as saith the apostle Jude, "a wandering star, to whom is reserved the blackness of darkness forever." What, then, is our hope, or what our comfort? This—"We are kept by the power of God, through faith, unto salvation."

The Love of Christ is the gravitating force of the spiritual universe, and the centre of that gravitation is

his Cross. "And I, if I be lifted up from the earth, will draw all men unto me." Yes, the cross of Christ—his suffering, dying love, as exhibited on that instrument of cruelty, ignominy, and torture—is the power, and the only power, adequate to arrest and attract sinful men. On the cross they behold the most astonishing, the most touching, the most melting manifestation of the Divine mercy and compassion! and from thence comes the hallowed influence which alone hath power to triumph over the obduracy of the human heart, and to bring into captivity its affections and passions all. On the cross, they see God—God in Christ—pitying, loving, dying for his erring creatures; see him voluntarily undergoing sorrow and agony inexpressibly affecting, to rescue their souls from the evil that was hurrying them into dread perdition! The sight attracts them, and moves them, as nothing else has the power to do. Never more are they able to withdraw their gaze from that Divine Victim. The wondrous Object takes entire and permanent possession of their whole being. A new and celestial gravitating power has seized every particle of their existence, and willingly they yield themselves to its sweet influences. With alacrity and delight they run in their appointed rounds of duty. And henceforth, as the morning stars sang together and all the sons of God shouted for joy, so they sing and shout, "God forbid that I should glory save in the cross of Christ!"

Thus, like the invisible power of gravitation in the world of matter, the Love of the crucified Son of God is silently but constantly acting, in the world of mind, drawing wanderers to himself, setting them in motion toward heaven, sustaining them in the path of duty and devotion, and daily propelling them forward in it with gladness and rejoicing.

We know of no force in nature more potent than that of the Sun's gravitation. No magnitude is too vast for its control, no distance is too great for it to span, no velocity is too swift for its pursuit, no body is too solid or too ethereal for its grasp; the mighty orb of Jupiter, the remote and lonely Neptune, the flying Mercury and the filmy comet, alike own its sway and obey its energy. So in the realm of mind and morals, we know of no power that equals, or that may be compared with, the Love of the Sun of Righteousness. There is no passion so strong, no affection so ardent, no propensity so inveterate, belonging to the human soul, but what it can subdue, and often has subdued. The desire of riches, the lust of pleasure, the attractions of fame, the fascinations of honor and power, the attachment of kindred, and even the love of life itself, have a thousand and a thousand times faded away and vanished when placed in competition with the love of Christ. And the power of that love remains the same yesterday, to-day, and forever. With equal joy and triumph, therefore, we exclaim with the Christian hero who had proved it on land and sea, in labors and perils, in stripes and imprisonment, in hunger and nakedness,—"Who shall separate us from the love of Christ? shall tribulation, or anguish, or persecution, or famine, or nakedness, or peril, or sword? Nay, in all these things we are more than conquerors through him that loved us. For I am persuaded, that neither death, nor life, nor angels, nor principalities, nor things present, nor things to come, nor powers, nor height, nor depth, nor any other creature, shall be able to separate us from the love of God, which is in Christ Jesus our Lord."

## ANALOGY II.

*As the Sun's gravitation is instantaneous and unremitting in its action upon all the globes of the system,—so the love of the Sun of Righteousness is instantaneous and unremitting in its exercise toward every member of his church.*

### PHENOMENA.

GRAVITATION, we have seen, is a universal force of matter, acting uniformly according to one and the same law throughout creation. But what is this gravitating force? Why should all matter have gravitation? Is it a necessary property of matter? or, could matter exist without it? Is it an inherent principle of material substances? or, is it the effect of motion or pressure from without? These are questions which have long engaged the study of the profoundest minds, but which thus far remain without any satisfactory answers. Some have conceived and put forth the idea that this force is the effect of subtle and infinitely ethereal particles ceaselessly *emanating* from the attracting body, something after the manner in which caloric emanates from a heated ball. But who is able to comprehend how particles streaming *from* a centre can draw a body *towards* it? The impulse in such a case must always be the other way. Others have ascribed gravitation to a conflux of particles incessantly flowing with a vast velocity towards a centre, and carrying down all bodies along with it. But from what source is this stream of particles fed? and what becomes of its accumulated discharge? Others, again, of a more metaphysical turn, tell us that, "Gravity is not a material entity, but the corrolate of thought to motion, the occult cause inferred by the mind where change of place is observed." This certainly is imposing diction; but what idea does it convey of the unquestionable pull or

pressure of gravitation? or what ray of light does it throw on the subject? None whatever. Others still have attempted to explain this force by supposing that there is diffused through all the vast regions where its action is displayed, between star and star, between mass and mass, molecule and molecule, an invisible intervening medium, bathing them on all sides, and pressing them one toward another. But if attraction is the result of such pressure, what is there without this medium to press *it* thus ever inward? or, if there is nothing, what prevents it, as Sir John Herschel asks, from expanding into infinite space, and losing itself there? Or, if it presses all bodies with so great a force as gravitation is known to do, how is it that it does not resist the planets in their onward motion, and ultimately bring them all to a dead stand? How can it *act* and *not resist?* If all space were filled with such a forcible medium, motion would be impossible.

Such are the theories that have been proposed to explain the nature of gravitation, all of which, as the reader must have observed, are based on mere assumptions. Not one of them in the slightest degree relieves the subject of its difficulties; nay, each of them assumes for its ground what would be as great a mystery as that which it seeks to explain. They amount to nothing more than speculative fables. Gravitation, as to its nature, remains as much a mystery to-day as it was in the day when Newton announced to the world the law that governs it. Indeed, its mysteries have been rather on the increase as it has been studied. Let us glance at some of these.

Gravitation acts in *perfect indifference to all intervening obstacles.* Nothing can hide or shelter an object from its grasp; nothing impede or lessen its energy. Of no other

force in nature can this be said. Floods, however impetuous, may be turned into new channels. Winds are arrested by mountains and forests. The lightning may be diverted from its course. The heat of the Sun is intercepted by the clouds. And even light, notwithstanding the etherealness of its medium and the swiftness of its flight, is either stopped or deflected, more or less, by almost every substance. But to gravitation all media are alike, and all perfectly transparent; nothing is able to reflect, refract, or absorb it. Two mountain peaks on opposite sides of the globe attract each other as if there were absolutely nothing between them. When the body of the earth, as happens at a lunar eclipse, stands in a direct line between the Sun and the Moon, and buries her in its deep dark shadow, the force of the Sun's gravitation upon her is neither retarded, nor diminished, nor in anywise affected by the interposition.

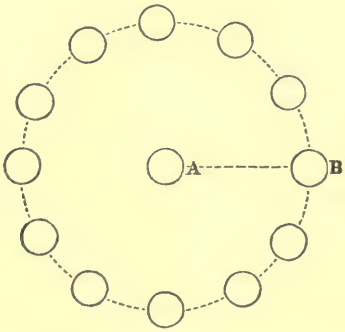
Again: Gravitation possesses a velocity that is almost, if not altogether, *instantaneous*. It requires no appreciable time to transmit its action over the greatest distances, or to reach the remotest planets of the system. It can be, and has been proved, that if there had been the least loss of time in the passage of the Sun's attractive force on the earth across the intervening space of ninety-two millions of miles, it would perpetually accelerate the motion of the earth in its orbit, and this acceleration, however minute, would of necessity result in a continually progressive increase of its major axis, and therefore of the length of the year. Supposing the transmission of gravity to be performed with the speed of *light*, the effect, Sir John Herschel assures us, would become evident in a few years. But not the least effect of this kind has taken place in hundreds or even thousands of years; not the least loss of time, therefore, has occurred in the

transmission of the Sun's attractive force. The actual velocity of light is 185,000 miles per second; but the velocity of gravitation, if any finite measure can be given to it, according to the calculations of Laplace, is at least, *fifty million times* that of light!

Again: Gravitation acts in a manner that seems to imply both the *creation* and the *annihilation* of force. It is now held among philosophers to be an established doctrine, that the amount of matter and the amount of force in the material creation ever remain the same—that nothing has been added to or taken from either the one or the other since the moment the universe was spoken into existence. But gravity appears to act, if not in absolute contradiction of this, yet in a manner that is utterly beyond the power of man to reconcile with it. For example, the globe *A*, attracts the globe *B*, at a given distance, with a certain amount of force; now, according to the law of gravitation, if this distance be reduced, say to one-tenth, the attracting force of *A* is at once increased just a hundredfold, a fact that implies an actual *creation* of force. Or, let us reverse the example, and increase the distance of *B*, say tenfold, and the force of *A* upon it is immediately diminished to just the one-hundredth part of its former amount, a change that implies an actual *annihilation* of force. Here, then, are two effects in connection with gravitation which seem to require the intervention of Infinite Power to produce.

Again, the received law of gravitation supposes that if *A* had been an isolated globe, the only one in being, it would have no gravitative force; but that, the moment the globe *B* (which by itself would also be without gravitative force) is brought into existence, gravitative force springs up in both globes. This, likewise, seems to imply the creation of force.

Once more; to take a different illustration of the mystery of gravitation, let us consider the mutual action of one globe and of many. Let the globe *A* occupy the centre of a circle, and the globe *B* be placed on its circumference, and the former will attract the latter with a certain amount of force. Now let another globe of the same mass and dimensions as *B*, be placed with it on that circumference, and this will be attracted by *A* with an equal force. And if other such globes be added, to the number of a hundred, or a thousand, and placed on that circumference, *A* will still attract each of these with the same power as it did *B* when it stood alone there.




ATTRACTION CREATED AND ANNIHILATED.

If now, instead of a circle, we imagine a sphere of the same diameter, and that this is inlaid or paved with similar globes to the number of a million, *A* will still attract each of these with exactly the same amount of force as the first. How are we to comprehend, how are we even to conceive of this force growing up in *A* to a millionfold its original amount? But further, let us now imagine these globes to be one by one removed and put out of existence, till *B* remains alone once more on the supposed circumference, and the attracting force exerted by *A* has been gradually diminished till reduced to the

millionth part, or that which it exerted on the first solitary globe. And have we not here again something like the *creation* and *annihilation* of force? or, at least, what is to us equally incomprehensible? Such are some of the mysteries connected with the force we call gravitation.

What, then, is gravitation? What can this power be which pervades all matter, uniting particle to particle, and which spans all space, binding satellites to their planets, and planets to their Sun? Human science, as we have seen, has failed to give any satisfactory answer to this question. If with Le Sage and Sir William Thomson we regard this force as the effect of an infinity of atoms flying inward with extreme velocity from ultra mundane space, we only remove the difficulty a step further back, and compel ourselves to look beyond for another and a higher agency, and to ask, whence comes this unceasing flood of particles? and who or what sets and keeps *them* in motion? Nor can we stop until, ascending from the limitable to the illimitable, we resolve it and its governing influence to the source and centre of all power—the *will-power* of the ETERNAL CREATOR, "who worketh all in all, and by whom all things consist."*

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* This is the conclusion to which not a few of the profoundest minds of modern times have come. Faraday, the distinguished English chemist, says, "All force is will-force." Sir John Herschel,—"The action of mind on matter admits of no explanation in words, or elucidation by parallels. We know it as a fact, but are utterly incapable of analysing it as a process. Now, all bodies with which we are acquainted, when raised into the air and quietly abandoned, descend to the earth's surface in lines perpendicular to it. They are, therefore, urged thereto by a force or effort, which it is but reasonable to regard as the direct or indirect result of *Consciousness* and a *Will* existing somewhere, though beyond our power to trace, which we term gravity." Professor Whewell,—"The knowledge and the agency of the Divine Being pervade every portion of the universe, producing all action and passion, all permanence and change. The laws of nature are the laws which he, in his wisdom, prescribes to *his own acts*." Sir Isaac Newton,—"All can be the effect of nothing else than the wisdom and skill of a powerful, everliving Agent, who being in all places, is more able by his Will to move the bodies within his boundless uniform *sensorium*, and thereby to form and re-form the parts of the universe, than we are by our will to move the parts of our own bodies. God is one and the same God always and everywhere."

## TEACHINGS.

Mysterious in many of its operations as is the force we have now been contemplating, it is yet rich in spiritual instructions of highest import and sweetest comfort to them who are able to read and to receive them.

As the Sun's gravitation is instantaneous and unremitting in its action upon all the members of his great system, *so the love of the Sun of Righteousness is instantaneous and unfailing in its exercise towards all his people.* It matters not in what sphere they move, or at what distance they may dwell, whether in the crowded city, or in the solitude of the wilderness, or afar off upon the sea, his ear is ever open to hear their cry, and the arm of his love ever able to reach them in a moment, yea, he even anticipates their wants, and provides for them ere they express their desires: "Before they call I will answer, and while they are yet speaking I will hear."

As the Solar gravitation is an ever-present force in all the globes of the system, never suspended, never intermitted in its action for an instant; so *the love of Christ ever abides with all his people, and is unremitting in its exercise for their welfare.* He never leaves nor forsakes them. "He that loveth me shall be loved of my Father, and I will love him, and manifest myself to him—and we will come unto him and make our abode with him." "Lo, I am with you alway, even unto the end of the world." What sublime promises! What an inspiring thought—*I am with thee!*

> "If Thou, my Jesus, still art nigh,
> Cheerfully I live, and cheerfully die:
> Secure when mortal comforts flee,
> To find ten thousand worlds in Thee."

As the Sun's gravitation follows one and the same law in its action on planet and planetoid, *so Christ in his*

*love toward all his followers.* With him is no regard of persons. He knows no distinction among men save that which arises from the state of their hearts. All ranks, all conditions are on the same level to him. Like the mysterious power of gravity, his loving care embraces all, and guides all, alike. He is as mindful of the peasant in his cottage as of the prince in his palace; and his love dwells as richly in the heart of the slave in his chains as in that of the monarch who sits upon his throne. "There is one law for him that is home-born, and for the stranger that sojourneth among you, for I am the Lord your God."

Again: As the Sun's gravitation can neither be intercepted nor impeded in reaching its object, *so neither can the love of Christ in reaching his people.* It matters not what their situation or surroundings may be. They may be sunk in poverty, or buried in obscurity, but this will not exclude his presence: "To this poor man will I look, even to him that is of a contrite spirit, and trembleth at my word." They may be driven into exile far from home, and friends, and every human association; but this offers no hindrance to the visits of his love; even in the lonely Patmos we hear the banished John rejoicing in the presence of "him who loved us, and washed us from our sins in his own blood." They may be in the hands of their enemies, or shut up within prison walls, or guarded by armies, or immured in dungeons, but these are no impediments to a Saviour's love. Iron gates and granite walls are as transparent to its access as the viewless air or genial sunshine. Peter was imprisoned of Herod, and doomed to die, but his soul was so tranquillized with that love, that he could peacefully sleep amid the four quaternions of soldiers. And Paul and Silas, when thrust into the inner prison, and made fast in the stocks, were heard singing his praises even at the midnight hour.

Yes, though mountains and oceans, or even death and hell should interpose, "they shall rest in his love, and rejoice in his salvation."

Again: As the Sun's attraction on any one planet is none the less powerful for his attracting many others at the same time, *so the love of Christ for any one particular believer is none the less ardent for his loving millions of other believers.* The Sun does not divide his attracting force, but repeats it; he does not direct a certain portion of his strength to this globe, and another portion to that, but exerts the attraction of his whole mass upon each. So neither is the love of Christ divided among his followers, but each has his whole heart; and if their number should be multiplied a thousand-fold, as assuredly it will at a coming day, each of these will still have the full measure of that heart's love. Moreover, the Sun's attraction is not enfeebled by the lapse of time, or by continued action, but is as powerful to-day to guide and uphold the system as it was in the day the planets accomplished their first revolutions. So the love of Christ for his people remains the same yesterday, to-day and forever. His love

> "Lives through all life, extends through all extent,
> Spreads undivided, operates unspent."

Once more: As gravitation involves much that is mysterious and inscrutable to human science, *so the religion of Christ embraces much that is altogether beyond the comprehension of man.* As Christianity relates to the Supreme Being, infinite and eternal in all his attributes, and to matters that are purely spiritual in their nature and unending in their duration, it of necessity embraces many things that are incomprehensible to frail and finite man —a creature whose sphere of vision is but a speck, whose

age is but a day, who left his cradle but yesterday and to-morrow sinks into his grave. To such a creature the religion of the Son of God must and does embrace many mysteries. His own pre-existence as a divine, infinite and eternal Spiritual Being is a mystery; his incarnation is a mystery; his ministry among sinful men is a mystery; his death, his resurrection and ascension are mysteries. "Without controversy," says the apostle, "great is the mystery of godliness; God manifested in the flesh, justified in the Spirit, seen of angels, preached unto the Gentiles, believed on in the world, received up into glory."

Now we have a class of men, scientific men, the materialists of the present day, who proudly reject Christianity on this very ground, namely, because it embraces so much that is mysterious and incomprehensible to them. "In endeavoring to understand it," say they, "we feel that we are dealing with a mere idle phantasy. Valid knowledge is to be found only by confining ourselves strictly to that realm to which science limits itself—the realm of phenomena and their relations." But is the field of science free from mysteries? Does not the philosopher, the genuine philosopher, who pushes his inquiries to the bottom of natural phenomena, to their ultimate relations and bearings and issues, find himself in a region full of puzzling perplexities, of operations and results that are inexplicable, of dilemmas that land him in what is inconceivable, and of problems that he has to give up as utterly insoluble? "The more we investigate nature," says Bixby, "the more miracles we find before our eyes." So Herbert Spencer—"Alike in the external and the internal worlds, the man of science sees himself in the midst of perpetual changes of which he can discover neither the beginning nor the end. In all directions his investi-

gations eventually bring him face to face with an insoluble enigma." So also Professor Tyndall—"The phenomena of matter and force lie before us," says he, "but behind, and above, and around all, the real mysteries of this universe remain unsolved."

But not to enter upon the difficulties and mysteries which science encounters in general, let us confine ourselves to those which are connected with the particular subject before us. Who shall explain to us the inconceivabilities and seeming contradictions that appear to beset the nature and action of gravitation? What is this ubiquitous force, and whence the unique law which it follows? Who shall make plain to us its apparent power of self-creation and self-annihilation? Who shall tell us when or how matter became endowed with this force, or where are the limits of its action? If this force is inherent in matter, what is its condition during the interval of its flight from the Sun to a planet, when it is not in connection with either? What is gravitation without matter? And what is matter without gravitation? Who can answer these questions? Who will undertake to explain these mysteries? No philosopher, no materialist even, pretends to be able to do this. Here, then, are difficulties that are, so far as he can see, as much beyond his comprehension as anything that is proposed to his faith in the Gospel. And yet notwithstanding all its mysteries, he receives the doctrine of gravitation without a question or a doubt. But the doctrines of the Gospel he will not receive; these he rejects. And why? Because there is mystery connected with them. What strange inconsistency! What palpable self-contradiction! Where is the philosophy of admitting that mystery is a necessary condition in the lower sphere of matter and force, and denying that it should exist in the higher sphere of mind

and spirit? Where is the reason of regarding mystery, in one subject, as being no valid objection to a doctrine, and in another magnifying it to an insuperable difficulty? Where is the superior discernment of those who can attach such widely different significance to one and the same thing? Is it not obvious that the true and real cause of this rejection of religion lies, not in the mysteries it embraces, but in the pride and self-sufficiency of human reason, and in the aversion of the human heart to its pure but humbling spirit? "Verily I say unto you, whosoever shall not receive the kingdom of God as a little child, he shall not enter therein."

## ANALOGY III.

*As, in obedience to the law of gravitation, the nearer a planet's orbit is to the Sun, the swifter its motion around him;—so, in virtue of the law of love, the nearer a Christian's path to the Sun of Righteousness, the greater the speed and delight with which he runs in it.*

### Phenomena.

In the infancy of his study of creation, the simplest and most natural idea to man, when he observed the daily race of the Sun and the nightly course of the Moon and stars, in the same direction, was, that the earth is a fixed body, the centre around which all these perpetually revolve. This would appear to him to be actually the fact. But in very early times another and a different opinion began to dawn upon a few gifted minds. It is supposed that Pythagoras, who flourished about 500 B. C., put forth the idea that the Sun, and not the earth, was the true centre of these revolutions. Whether this be true or not, it is certain that this doctrine was taught by Aristarchus, some 280 B. C. But Ptolemy, an Egyptian

astronomer, who lived in the second century of the Christian era, advanced quite a different theory. He held that the earth was the centre of a system of eight immense hollow spheres of crystal, placed one within the other: that the Moon was in the nearest sphere; Mercury in the next; Venus in the third; the Sun in the fourth; Mars, Jupiter, and Saturn, in the fifth, sixth, and seventh, respectively; and that the eighth belonged to the Stars, which, though most distant, were still visible through the transparent crystal. The revolution of this complicated system of spheres around the earth from east to west once in twenty-four hours, he thought would account for the succession of day and night, and the various phenomena of the heavens.

The theory of Ptolemy gained great popularity, and was the one commonly received and taught for nearly fifteen centuries. At length, however, it was discarded, as failing to account for many of the observed celestial motions, in any reasonable or consistent way. In 1473, a man by the name of Copernicus was born in Prussia, who, though invested with the office of a priest, became an indefatigable student of the heavens, and ere long found abundant reasons for rejecting the system of Ptolemy, and returning to that of Pythagoras and Aristarchus. His course, for a time, was strenuously opposed and bitterly denounced, as being unscriptural and profane. His three fundamental points were, that the earth is round; that it turns upon its axis from west to east; and that the earth and the other planets revolve around the Sun.

About a century later arose the distinguished Kepler, who heartily embraced and advocated the views of Copernicus, and who by careful observations and laborious calculations did much to establish his theory. Contem-

porary with Kepler was Galileo, an Italian philosopher, the inventor of the telescope, and the first that employed that instrument to scan the heavenly bodies. Directing his new invention to the planet Jupiter, there he beheld what mortal eyes had never seen before—its four revolving moons. Yes, in that planet and his encircling satellites he discovered in actual play a miniature system, such as Copernicus and others represented the Sun and the planets to be. This dissipated the last shadows of doubt concerning the truth and correctness of the Copernican system.

But the problem, What is the cause of the planets' motions—what power or force carries them forward in their orbits—still remained unsolved. The first attempt of note to answer this question was made by Descartes, a Frenchman. "This philosopher supposed the Sun to be immersed in a vast mass of fluid, extending indefinitely in every direction. The Sun, by its rotation, set the parts of the fluid next to it in rotation; these communicated their motions to the parts still further out, and so on, until the whole mass was set in rotation, like a whirlpool. The planets were carried around in this ethereal whirlpool. The more distant planets moved more slowly because the ether was less affected by the rotation of the Sun the more distant it was from him. In the great vortex of the solar system were smaller ones, each planet being the centre of one; and thus the satellites, floating in the ether, were carried round their primaries." Such was the celebrated theory of vortices, which, being the mere figment of a vivid imagination, was doomed to share the fate of that of Ptolemy.

It was reserved for the immortal Newton to give the true explanation of the force and law by which the great system of creation is upheld and kept in perpetual mo-

tion. The bases of Newton's discovery were these three laws:

1. *A body once set in motion, and afterward acted on by no force, will move forwards in a straight line and with a uniform velocity forever.*

2. *If a moving body be acted on by any force, its deviation from the motion defined in the first law will be in the direction of the force, and proportional to it.*

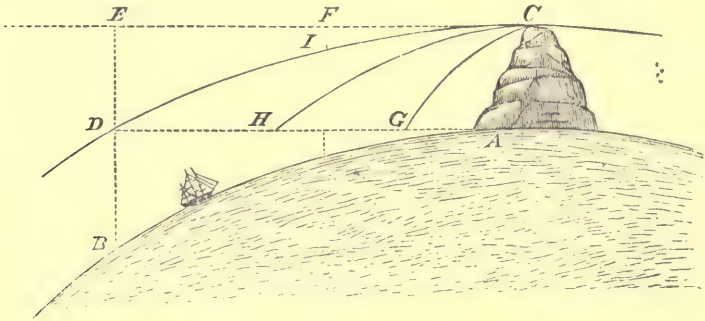
3. *Action and reaction are equal, and in opposite directions;* that is, *whenever any one body exerts a force on a second body, the latter exerts a similar force on the first, only in the opposite direction.*

Applying these laws to the action of gravitation, Newton was enabled to prove that the motion of a planet in its orbit is the result of two forces—one *the original forward impulse*, which gives it a tendency to move off from its orbit in a straight course, and which is called the "centrifugal force"—the other *the attraction of the Sun*, which draws it towards its own body, and is called the "centripedal force." All this may be a little obscure and difficult to some readers, but we shall now offer a simple illustration that will make it perfectly plain to those least familiar with such subjects.

It has been found, and in various ways proved, that if a cannon ball, or any other body, be dropped from some high point, and left to descend freely, it will fall by the force of gravitation through a distance of sixteen feet in the first second of time; three times that distance, or forty-eight feet, in the next; five times, or eighty feet, in the third second; and so on. And gravitation being instantaneous in its action, if that ball, instead of being dropped, be shot from a cannon, in a horizontal direction, it will draw it downwards through just the same distances through the successive seconds of its flight, as when sim-

ply dropped. In the annexed figure, *A B* represents a portion of the curved surface of the earth; *A D* is a horizontal or level line from the point *A*. By calculation it is found that the curved surface of the earth falls below this line about eight inches in the first mile; twenty-four inches more in the second mile; and so on. In five miles the fall will amount to sixteen feet; and in ten miles, three times that amount more, or sixty-four feet, and so on; a series of distances which agree exactly with that of a falling body.

Now, let *A C* represent a lofty mountain, standing on the equator, from the summit of which a cannon ball is




AN ARTIFICIAL SATELLITE.

fired in the horizontal direction *C E*. The greater the velocity with which the ball is shot, the further it will go before it is brought down to the ground, as indicated by the curves *C G* and *C H*. Let us suppose that it can be fired with a velocity of five miles per second, and that it meets with *no resistance from the atmosphere*. Let *F* mark a point five miles from *C*, and *E* ten miles from the same. Now, since the ball occupies one second of time in reaching the point *F*, it follows, from the law of falling bodies just stated, that it will have dropped sixteen feet below *F*, and be at *I*. But, as we have just

seen, the earth also has curved away just sixteen feet at this distance. Hence the ball is no nearer to the earth than when it began its flight. At the end of the next second, the ball instead of being at *E*, will have fallen forty-eight feet more, or sixty-four feet in all, and be found at *D*. But here, again, the earth has still been rounding off, so that the distance from *D* to *B* is likewise sixty-four feet. The ball, therefore, at the end of two seconds is no nearer to the earth than when it left the cannon's mouth. Advancing still from *D*, with undiminished velocity, it will be found just at the same distance from the earth's surface at the end of the third, fourth, fifth, and every subsequent second. Thus the ball will go on and make a complete circuit around the earth, coming back to the point *C*, to pursue the same round again. The time of its revolution, allowing it to have been fired from a point ten miles above the level of the sea, would be one hour, twenty-three minutes and thirteen seconds. Thus a ball projected with a velocity of five miles per second, and meeting with no resistance from the atmosphere, would become a satellite of the earth, and, like the moon, revolve forever around it.

If the velocity of such a ball were less than five miles per second, the earth's attraction would overcome its centrifugal tendency, and soon bring it to the ground. If the velocity were increased to six miles per second, or thereabout, it would take an eccentric course, and describe a long ellipse around the earth. But if the velocity reached seven miles per second, or went beyond that, the centrifugal force would be too powerful for the earth's attraction, the ball would escape from its grasp, and fly off into space never to return again.

Now, the action of the earth's gravitation on this projected cannon ball, carrying it exactly like the moon

around her, is a correct representation of the Sun's gravitation on each of the planets, carrying them severally in their orbits around him. As the ball must move with a certain velocity to preserve its distance from the earth, so must each of the planets move with a velocity proportionate to the attraction exerted by the Sun upon it to keep in its appointed orbit around him. If the velocity or centrifugal force of a planet were too small to balance the attraction of the Sun, it would be continually drawn inward toward him, so that after a few revolutions at most, in the form of a spiral, it would finally fall upon him. On the other hand, if the velocity or centrifugal tendency were too great, it would continue to revolve at an ever-increasing distance from him, until it would eventually forsake its authority altogether. This is a matter susceptible of demonstration. The earth now travels in her orbit with a mean velocity of 18.3 miles per second; if this were increased to 25.9 miles per second, she would free herself from her allegiance to the Sun, receding further and further from his light and heat, until finally lost in the cold and darkness of infinite space. The present velocity of Jupiter is 8 miles per second; if this were increased to 11.3 miles per second, this majestic orb would become a similar wanderer in the void profound. And so of the rest. No planet in the system could preserve its present orbit with any different velocity from that which it actually has. The velocity of each is exactly adjusted to the Sun's gravitation upon it, and that gravitation is exactly measured by its distance from him.

But more even than all this was required to set the system in its present safe and harmonious revolutions. Not only was it necessary to give the right velocity or forward impulse to each planet, but that impulse must be

given in the right direction—*one* and *only one* direction would answer. If the cannon ball, which we have supposed, had been fired at an angle of twenty-five or thirty degrees above the horizontal line, or at such an angle below it, it is obvious that its flight would have been altogether different, and would have never carried it once round the globe. So with the *original impulse* given to the planets. A thousand different rates of velocity, and a thousand different directions for the impulse, might have been adopted from what actually prevail; but only one velocity and only one direction could produce the existing orbits of the system. The velocity and the direction must *both* be right. If the velocity had been wrong, no direction given to the impulse would have cured the error; or if the direction had been wrong, no degree of velocity would have rectified the obliquity. Thus we find that, in the celestial machinery, everything has been determined by exact measurement of distance, weight, and speed. How evident, and how conclusive, then, the inference, that all is the work of a Being unerring in intelligence, as well as almighty in power! "Such an exquisite structure as the Solar System," says the profound Maclaurin, "could only arise from the contrivance and powerful influences of an intelligent, free, and most potent AGENT."

In accordance with the one universal law, as we have seen, the Sun's attraction on the planets decreases inversely as the squares of their distances. And to balance their centrifugal force with this force of his gravitation, the velocities decrease in the same manner. In other words, the nearer a planet is to the Sun, the greater is its velocity. This, for the whole system, will be best presented, and best understood, by placing *in miles* the mean distance and the mean velocity of the principal planets in a tabular form, such as the following:

| Planets. | Distances. | Velocity per sec. |
|---|---|---|
| Mercury . . . . . | 35,392,000 | 29.3 |
| Venus . . . . . | 66,134,000 | 21.4 |
| The Earth . . . . . | 91,430,000 | 18.3 |
| Mars . . . . . | 139,311,000 | 14.7 |
| The Asteroids . . . . | 250,000,000 | 11.0 |
| Jupiter . . . . . | 475,692,000 | 8.0 |
| Saturn . . . . . | 872,137,000 | 5.9 |
| Uranus . . . . . | 1,753,869,000 | 4.2 |
| Neptune . . . . . | 2,745,998,000 | 3.3 |

A glance at the above table will suffice to show that the velocity of the planets, throughout the system, uniformly decreases as their distance increases. Mercury, the nearest to the Sun, travels faster than Venus, which is further off; faster yet than the Earth, which is still more remote; twice as fast as Mars; five times as fast as Saturn; seven times as Uranus; and nine times as Neptune. And if another planet should be discovered beyond Neptune, say at four times its distance, Mercury would be found travelling at seventeen times its rate. On the other hand, if a planet were placed, or should be discovered at one-half the distance of Mercury from the Sun, moving in a similar orbit, it would be found moving with a velocity of 41 miles per second; and if another yet at half the distance of the latter, it would be advancing at the rate of 58 miles per second; and if a third at one-fourth the distance of the last, or one-sixteenth that of Mercury, it would be found flying forward with the velocity of 234 miles per second. And, lastly, a planet moving in a circular orbit close to the globe of the Sun, as we have supposed the cannon ball to do around the earth, would sweep onward with a velocity of 268 miles per second, or 964,800 miles per hour. *Universally*, then, the nearer the planet is to the Sun the swifter its flight; and the more remote, the slower is its motion.

## TEACHINGS.

The system of creation, in its structure and play, as now described, is one of the most elevating and instructive subjects upon which the human mind can dwell. While its vast magnitudes and overwhelming velocities fill the soul with awe and wonder, its balanced forces and measured distances and harmonious and infallible revolutions delight the reason and charm the imagination. And we withdraw from the contemplation with a conviction as clear and powerful that the whole must have had its origin in one Omniscient Mind, as that the watch in our hand, with its moving wheels and springs and dial-plate, must have been the product of a designing and ingenious artificer.

> "Though no real voice nor sound
> Amid these radiant orbs be found,
> In *reason's* ear they all rejoice,
> And utter forth a glorious voice,
> Forever singing as they shine,
> 'The HAND that made us is DIVINE.'"

The celestial forces and revolutions we have now been contemplating read to us also important lessons of a more practical and personal bearing. As in obedience to the law of gravitation, the nearer a planet's orbit is to the Sun, the swifter its motion around him; so, *in virtue of the law of love, the nearer the Christian's path to the Sun of Righteousness, the greater the speed and delight with which he runs in it.*

The distance of a planet from the Sun affects not simply its rate of motion but also its degree of light and heat. Mercury, which is so much nearer to the Sun than the earth, not only revolves far more swiftly around him, but also enjoys seven-fold more light and heat. On the other hand, Neptune, which is so much more remote, travels far more slowly than the earth, and receives but

the one-thousandth part of her light and heat. So of all the other planets according to their respective distances. In these varied positions and advantages of the planetary globes, then, we have an apt representation of the different grades of character and experience found in the Christian world.

Among those professing godliness there is a class who live, and are content to live, at such a distance from the Sun of Righteousness, that they may be justly compared to those globes which revolve in the outer orbits of the system. Light they have, but it is very dim; and some degree of the warmth of love they know, but it is very faint; and some motion of life they manifest, but it is very slow and feeble. And yet, like those remote and lonely planets, they own the authority of the great Central Sun. They do not recede from him, and they do not appear to approach him; but from year to year pursue the same old path, at the same slow rate. Cold and cheerless stars!

There is a second class of Christians, who may be likened to the planets of the middle orbits. These enjoy more light and heat than the former, and are under the dominion of a more powerful degree of the attraction of love, and consequently move more swiftly and vigorously in the path of duty. They know and realize that they have been redeemed with no less a price than the precious blood of the Son of God; and his surpassing love has begotten love in return in their own hearts. And this love makes his yoke easy, his burden light, and his service a pleasure. Cheerfully they lay aside every weight, and every sin that besets them, and run with patience and joy the race that is set before them.

And there is a third class, who are best represented by those innermost planets of the system, which perpetually bask in the full light and heat of the solar orb, and

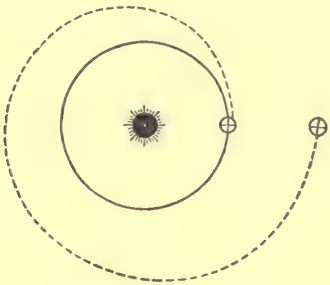
wheel their courses with unequalled speed around him. These live still nearer the Fountain of life and glory. Their communion with the Sun of Righteousness is more abundant, more exalted, and more complete. Their faith, and love, and joy are more vivid and ardent and strong. Like the bright and morning star, and that still nearer orb, which forever revolve in the effulgence of the solar rays, they live and move and have their being in the light of the Divine countenance. They encompass his throne with alacrity and delight. The supreme occupation of life with them is to commune with him who dwells between the cherubim. Like Moses, they talk with their blessed Lord, as if face to face. Like Paul, for them to live is Christ. And like John, they repose in peace on the bosom of infinite and eternal Love.

And there is yet a fourth class, a higher grade, holier and happier even than the last; these we may compare to those planetary bodies we have imagined revolving in close proximity to the globe of the Sun, and encircling it with a velocity surpassing all thought and comprehension. We speak of *the spirits of just men made perfect;* the souls that have been caught up from this nether sphere, and made like unto the angels, whose holiness and happiness are complete, whose minds are enkindled with one intense and eternal flame of divine love, burning with a clear, unceasing and perfect ardency and splendor.—Such are the several grades or classes of Christians, who, as spiritual planets, so to speak, revolve around the Sun of Righteousness, some more remote, some nearer, and some in his immediate presence. And from all this what is the lesson we are to gather? Simply this—The nearer we live to Christ, the more delightful his service, the more rapid our progress, and the more complete our happiness.

To the above, it must be added that, not our happiness only, but *our safety also* depends upon a close and near walk with Christ. The nearer to the Sun a planet revolves, the stronger is the grasp of his gravitation upon it, and the firmer it is held in its path. To carry Mercury away from its orbit and from its allegiance to the Sun, would require an increase of 12 miles per second in its centrifugal flight or forward motion; while to carry Jupiter away, at thirteen times the distance, would require but an increase of 3⅓ miles; and to carry Neptune, at seventy-seven times the distance, only an increase of 1½ miles per second. Thus, the further from the Sun the less force is required to propel a planet from its appointed orbit. So with the Christian; the nearer his path to the Sun of Righteousness, the stronger will be the attraction of his love, to keep him in the right and safe way; but the further he walks from Him, the lesser the force of temptation that will suffice to carry him astray.

Finally, this subject offers an impressive illustration of *the danger of yielding to any influence that will draw us away from Christ.* If a planet in its revolution should be encompassed by an outside zone of attraction that perpetually drew it away from the Sun, be that attraction ever so small and that deviation from its path ever so gradual, it would result inevitably in its destruction. For in that case, the form of its orbit would be changed into an expanding spiral, as indicated by the dotted line in the following figure, so that at each successive revolution it would be found further and further from the Sun, till at length it would reach a distance from which nothing but a special act of Omnipotence would ever bring it back again to its proper orbit. The condition of the Christian in this world is precisely the condition of such a planet.

Through life he is encompassed with an attraction whose tendency is to draw him out of his right course and away from the Sun of his soul, and that is *the attraction of the world*, of its riches and honors and pleasures. But there is this difference: he has the power to resist this attraction; if he is drawn aside by it, it will be with his own consent. And if he yields, if he gives himself up to worldly influence, how sad his estate! how melancholy his prospect! Henceforth his career will be that of the erratic planet. The attraction of the Sun of Righteous-



ERRATIC PLANET.

ness will decline and lose its power over him, while that of the world will grow more and more controlling. He may flatter himself that, because he has not altogether lost sight of that Sun, he is still revolving around Him. But he is steadily departing from the glorious orb; His beams with each passing day are growing fainter and feebler. The change may be gradual, but it is certain. He is advancing deeper and deeper into the region of cold and darkness and cheerlessness. And at length he reaches a depth, though his soul may be all unconscious of the fact, from which nothing but a special, marvellous, yea, miraculous, interposition of grace can save him from becoming *a wandering star, to whom is reserved the blackness of darkness forever*. Reader, if you have reason to sus-

pect that your own course has now been described, look again at the above silent figure, and note the path therein portrayed.—Is it not your own?

## ANALOGY IV.

*As the Sun of Nature guides and controls his planetary family, not by pressure or contact, but by the subtle influence of his gravity;—so the Sun of Righteousness leads and governs his human family, not by force or constraint, but by the attracting influence of his truth and love.*

### Phenomena.

Man claims the honor of being the author of many great and wonderful works,—of having contrived and constructed many exquisite machines, of having set in motion engines of vast power, and of having formed extensive combinations to effect the results which he desires to accomplish. And all this is true. But it should never be forgotten that in all these he has simply taken advantage of materials prepared to his hand, and of the varied properties with which those materials have been endowed. He has never been able to produce any new material, nor to impart to that which exists any new quality, nor to infuse into it any new force. He has established no new law for any department or element of nature, nor even modified the action of any of the old laws which he has found in operation. He can impart to no substance any new affinity, any new power of attraction or repulsion, or any new law of motion or expansion. He cannot, with all his chemistry, form a drop of water in any other manner than that in which every drop has been formed since it began to rain upon the face of the earth. His greatest achievements, whether of skill

or of power, have been made simply by directing, combining, or opposing forces or elements that have been in being and in activity since the world began.

Persevering as has been his study, surprising as has been his ingenuity, and wonderful as is the progress he has made in science and art, man can make no higher claim than *this* to-day. He travels over the land and sails over the ocean, he ascends into the skies and dives into the deep, but all this he accomplishes by means of forces operating according to laws established with the creation of matter. He constructs his telescope, his microscope and his spectroscope, and discovers new worlds of wonder both above and below, but these instruments avail him only in virtue of the laws of reflection and refraction to which the ethereal element of light has been made subject. He contrives instruments of music, his harp and organ and lute, but all the pleasing harmony of sounds they produce is due to the elastic and vibratory constitution given to the atmosphere; but for this, they would be charmless as the icicle and mute as the rock. His inventions and productions all, then, are simply means to take advantage of what has been so munificently provided and so wisely arranged for his benefit long before he came into being.

Very different, therefore, from all that man has accomplished, or ever can accomplish, must be our conceptions of the works of the Divine Architect. He is not only the contriver and maker of an infinite variety of machinery on the earth and in the heavens, but also the Creator of the materials which compose them, and the Originator of the forces that actuate them. And He not merely caused these materials to come individually into being, but also endowed them with the properties and qualities by which they are fitted for their several uses. He is

the Author of all their attractions, repulsions, and affinities—of all the laws of their chemical, physical, and mechanical action. He borrowed nothing. And this places the works of the Deity far and forever beyond any analogy or comparison to human productions.

And then, the excellency and perfection of the Creator's works. Well might the inspired writer have exclaimed, "O Lord, there are no works like unto thy works." We have spoken of the planetary system as the *Celestial Machinery*—but it is machinery totally different from anything that the hands of man have ever produced. As I have elsewhere stated, "the planetary mechanics are of such exquisite perfection, and their parts move and act upon one another upon principles that render them wholly dissimilar from every contrivance and fabrication of man. In our machinery everything goes on by contact and impulse; pressure and force by cogs, rods, belts, water, wind, steam, etc., are the means by which motion is transferred to and from every wheel, lever, and spring. But in the machinery of the heavens we discover nothing of all this. Here we behold spheres, enormous spheres in free and boundless space, without any material or visible connection, separated by spaces which can only be estimated by millions of miles, yet affecting one another powerfully, constantly, and infallibly. Here are worlds on worlds of every magnitude, and placed at every distance—planets and rings and satellites—all in ceaseless rotation, and all careering through the trackless void with velocities appalling to contemplate, without any visible power or agency to produce their motions, or to guide them in their appointed and mighty circuits; yet every one completing its daily rotation, and accomplishing its annual round of hundreds of millions of miles, without deviating the fraction of a minute from age to

age, and from century to century. Here is mechanism, indeed, the most sublime! Here is mechanism worthy the Divine Architect!" *

And what are the bonds of connection which hold in unity this vast and magnificent system? and what the motive power that keeps it in ceaseless and harmonious revolution? Here are no beams of timber, no bars of steel, or chains of iron. Here is no pressure of wind or water, of expanding steam or gas. What then unites and moves the whole? The simple but subtle power of the great central orb—*the Sun's gravitation.* This it is that holds all, impels all, guides all, as no material bond or power could. Under the controlling influence of this mysterious agency, not a globe, great or small, deviates or falters in its path—not a wheel jars or creaks in the system—not a sound disturbs the deep and solemn quietude of the midnight sky. Smoothly, silently, and harmoniously, every planet performs its mighty and sublime revolutions. And who that rightly considers all this, but must feel his soul inspired to exclaim with the devout Psalmist, "The works of the Lord are great, sought out of all them that have pleasure therein. His works are honorable and glorious. They stand fast forever and ever."

### Teachings.

As the Sun of nature thus guides and controls his planetary family, not by pressure or contact, but by the attracting influence of his gravity,—*so the Sun of Righteousness leads and governs his human family, not by force or constraint, but by the winning influence of his truth and love, as revealed in his Gospel.* His reign is a spiritual reign, and the allegiance he requires and seeks is the allegiance of the soul.

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* *Science and the Bible*, p. 318.

Man is a free moral agent, endowed with reason, conscience, and self-determining will; and his Divine Lord deals with him as such. The government he exercises over him is a moral government, carried on by the appeals of truth to his reason, of right and wrong to his conscience, and of motives to his will. His rule is a spiritual rule over the mind and heart. Force or constraint is foreign to the nature of his kingdom, and unfitted to secure the service which he requires and accepts. Pains and penalties, stripes and imprisonments, never made one soul loyal to his authority, or added one sincere worshipper to the number of his followers. And these are means he never appointed, never sanctioned. Constrained or forced service is to him service of no value. The obedience which he requires is willing and cheerful obedience, and the homage which he receives is the voluntary, grateful and loving homage of the soul.

And this is what man owes to his Maker; this is his reasonable duty. Nevertheless, he is left at liberty to do as he will, either to yield or to withhold this obedience and homage. He is left free to choose his own course. His will is free from all restraint, hindrance, or control —as free as we can conceive it to be—as free as God himself can make it. The proof of this lies in every man's consciousness, and lies so deep that it never has been and never can be effaced. Even the Stoics, the champions of fate, strenuously asserted the liberty of the will.* And Descartes, in the very passage in which he asserts that God is the cause of all our actions, appeals to the evidence of consciousness for the freedom of the will.† Man is ever conscious and knows that he chooses, rejects, and resolves freely. He is conscious and knows

* *Enchiridion* of Epictetus, the opening sentences.

† *Cartesii Epistolæ*, VIII., IX., Pars 1.

that he has the power of self-determination; that his will is not forced, or compelled, or controlled by any power or agency from without himself; that it is under no irresistible law or influence, either for good or evil; but is constituted and conditioned to choose or refuse freely and as it pleases. It is this fact that makes him, and justly makes him, an accountable being.

If the acts of man were at any time, or in any case, involuntary, or compulsory, and not the effect of his own determination and free choice, he would be so far alike blameless and meritless. But no act of man is of this negative or neutral character; on the contrary, for every idle word and secret thought he shall give an account to God. What the soul is and does, it chooses to be and do; and is, therefore, ever accountable for what it is and does. Hence, it is the freedom of the will that constitutes man a proper subject of praise or blame, of reward or punishment, and makes morality and religion possible. Without freedom of will moral obligation could not exist, and religious obedience and devotion could have no place.

The freedom of the will, then, is an unquestionable fact. It is admitted by common consent. It is recognized in the forms of speech, in the religious faith, in the judicial administrations, in the established practices, and in the daily intercourse, of all mankind; nor does any rational being ever lose the consciousness of it.

Accordingly, the only means which Christ employs to reclaim, to lead, to govern, and to save men, are moral means, appeals to the reason, to the conscience and to the heart. And the command, the simple and only command that comes with all these is, "Choose ye now whom ye will serve." The service of God, or religion, therefore, is as completely an object of choice as anything else. If

a man becomes religious, or a Christian, it is because he chooses to become such; and if he remains irreligious, or not a Christian, it is because he chooses to remain so. This is the doctrine of the Gospel; it underlies all the invitations and promises of the Gospel; it is involved in all the terms on which salvation is offered in the Gospel; and it is assumed in the whole system of means and motives presented in the Gospel.

Religion, as embracing both faith and practice, is a matter of choice from first to last. It is obviously a matter of choice with a man whether he will read the Scriptures with care and candor, or leave the holy Book unopened, indifferent and unconcerned as to what it may teach or contain. It is a matter of choice in no trivial sense, whether he assents to the Divine authority of the Sacred Volume, or rejects it. *Belief* here is not an involuntary, and, therefore, an irresponsible act. "The state of mind which constitutes belief is, indeed, one over which the will has no *direct* power. But belief depends upon evidence; the result of even the best evidence is entirely dependent on attention; and attention is a voluntary intellectual state over which we have a direct and absolute control. As it is, therefore, by prolonged and continued attention that evidence produces belief, a man may incur the deepest guilt by his disbelief of truths which he has failed to examine with the care which is due to them."* The power of evidence to produce conviction or belief depends also upon the candor with which it is weighed. Two men of equal intelligence, of equal mental penetration, clearness, and grasp, may read the Bible and come to very different conclusions. One chooses to examine it in a teachable and humble spirit, desirous of knowing the truth, whatever it may prove to

* Abercrombie's *Moral Feelings*, p. 182.

be; and he seriously and impartially weighs the evidences that come before him; and as he does so, these evidences insensibly grow in force and clearness to his mind, till he feels them to amount to a conclusive proof that the Book is the product of inspiration. The other chooses to investigate it in a different and opposite spirit; his mind is under the dominion of a certain set of preconceived notions, which he holds as the standard of truth and right; and whatever he finds to conflict with these he rejects, and hence soon decides against the Bible's claims to inspiration. The act in either case is perfectly voluntary.

There is the same exercise of free will in the saving act of accepting and embracing Christ as our personal Saviour. Previous to this act, the world with its interests and pleasures stands in competition with Christ and his salvation. During this period, the world has the sinner's preference; his choice is intensely set upon it; it has the foremost place in his thoughts, and occupies the whole field of his vision. Meanwhile Christ has for him neither glory nor attraction; he discerns not the excellency of his character, nor the importance of the blessing of his salvation; that salvation for aught he knows may be something very good for others, but he feels no interest in it, and no desire for it. But under the gracious influence of the Spirit his views change; the world sinks, dwindles to utter insignificance, while Christ so increases in interest, importance, and loveliness in his estimation, that with all the earnestness of his being he now chooses him as the supreme portion of his soul. And in making this choice he is perfectly free; the Divine Spirit in nowise interferes with the freedom of his will; he employs no force or constraint, bestows no new faculty, reveals no new truths, presents no new evidence.

What, then, is the office of the Spirit in the conversion of the soul? The Spirit simply disposes and leads the mind to an honest and serious consideration of truths already made known, namely, the corruption of his heart, the sinfulness of his life, the justice of his condemnation, the peril of his soul, his need of a Saviour, and the suitableness and loveliness of the One revealed and offered in the Gospel. The Spirit employs no power, no influence, save that of truth and love. No man is constrained against his will to become a Christian; if he does become a Christian, it is by the most free choice of his own soul. Every one who has become a Christian is conscious of being as voluntary in embracing Christ and in committing his soul into his hands, as in any other act of his life. And one proof of it among many is, that he condemns himself for not having done this act long before.

To all this it may be added, that the Christian exercises the same freedom of choice in all his subsequent acts and habits—in reading and meditating on the word of God, in his prayers, in his social intercourse, in his attendance on the ordinances of grace, in his improvement of the dispensations of providence; in everything, in short, that enters into his progress in the divine life. As the planets move freely through the voids of space, guided simply by the attraction of the Sun of nature, so the Christian moves freely in his course through life, influenced and governed simply by the attractive power of the truth and love of the Sun of Righteousness.

## ANALOGY V.

*As the force of gravitation, which rules in the system of nature, is so evenly and finely balanced, that any change in the mass or distance of one of the planets would be felt at the centre of the Sun;—so the love, which reigns in the spiritual system, is so delicate and infallible, that whatever affects the condition or interest of one member is felt at the heart of the Sun of Righteousness.*

### PHENOMENA.

THE successive steps by which the immortal Newton was led to the discovery and demonstration of the universal law of gravity compose a narrative of extreme interest. His first calculations to determine it, owing to an error in the commonly received estimate of the earth's dimensions, did not prove satisfactory, and were therefore laid aside. Some few years later, when the radius of the globe had been more accurately determined, he undertook the revision of his former computations. And it is related that towards the close of his work, when it began to dawn upon his mind that his calculations were going to verify his long cherished theory—when he felt that he was on the eve of discovering the most sublime and important law ever contemplated by the human mind—he was so overpowered by nervous agitation at the anticipated result, that he could not go on and finish his task. In this state of mind he was obliged to call in the aid of a friend; and while the few last arithmetical operations were being concluded, he paced his room in trembling expectation of their announcement. In this supreme moment, he doubtless perceived that his hand was upon the key that would explain the connections and relations of the whole system of nature, and his clear and energetic intellect already began to sweep forward to the most far-reaching and comprehensive generalizations. Nor was he over-hasty—the calcula-

tions so came out as to establish forever the great and universal *Law of Gravity.*

Glorious achievement! Through it Newton caught at once, what human ear had never caught before, the true "music of the spheres;" the strains as yet, indeed, were soft and low, but clearly promising of ineffable melodies soon to be more distinctly heard. It was to him as the *shell* of which speaks the Arabian Maid, in Gebir:

> "Apply its polished lips to your attentive ear,
> And it remembers its august abodes,
> And murmurs as the Ocean murmured there."

Guided by this law, its illustrious discoverer, by chains of reasoning as brilliant as profound, was rapidly conducted to a series of most interesting and important conclusions. By means of it he was enabled to determine the varying curves described by all the bodies of the solar system; the action of sphere on sphere; the gravitation of the Sun on the planets, and of the planets on their satellites; the respective densities of the Sun, of the earth and the other planets; the centrifugal force which combines with the centripetal to preserve the balance of motion round the centre; the varying weight of bodies at the poles and at the equator; the true theory of the tides; the explanation of the inequalities of the moon's motion; the precession of the equinoctial through the circuit of the heavens; the orbits and motions of comets, etc. In the study of these and kindred subjects, Newton was followed by a succession of distinguished mathematicians, foremost among whom were Halley, Clairaut, D'Alembert, Euler, Lagrange and La Place—all men of the most exalted genius, and who wrought out the law of gravitation to its mightiest and minutest results.

Among the most marvellous triumphs of science in the

application of the Law of Gravity may be reckoned *the weighing of the planetary globes.* Incredible as it may seem to some, the astronomer is able to employ Gravitation as a balance, in which he can poise planet against planet, and planet against the Sun, and determine their relative weights with as much ease and exactness as the engineer can compute the number of tons in the granite monument of Bunker Hill, or in the iron cannon planted on the walls of Fortress Monroe. And as it may be of interest to those not versed in such matters, I will briefly and in general terms state the process by which this has been accomplished.

The first step in the operation was to determine the density and the weight of the globe upon which we live. This was computed in several ways. 1. By comparing the attractive force of a large metallic ball, of known size and density, with that of the earth. 2. By finding how much a large mountain will deflect a plumb-line, or draw it toward itself from the perpendicular. 3. By determining the rate of vibration of the same pendulum on the top and at the bottom of a mountain, or at the bottom of a mine and at the earth's surface. The average result of all these determinations gives the earth a density of 5.46; that is, the whole globe of the earth as it exists is 5.46 times the weight of a globe of water of the same dimensions; or in round numbers, 6,000,000,000,000,000,000,000 tons.

Now it will be remembered that, in Analogy III., of this Part, we saw that the earth, at the distance of 4,000 miles from its centre, will draw the flying cannon ball downward 16 feet in one second of time; and by a simple calculation it is found that the Sun, in a similar manner, draws the earth in its flight inward .0099 feet in a second of time. Hence, knowing the earth's weight, and

her distance from the Sun, and that his gravitation diminishes inversely as the square of the distance, by two other steps of easy proportional computation we ascertain what his actual mass or weight must be to exert this attractive force on our globe; and this is found to be 311,281 times that of the earth. This may serve to convey to the reader a general idea of the process by which the masses or weights of the planetary globes have been determined. To enter upon the details of such calculations in relation to the other planets and their satellites would carry us altogether beyond the limits and beside the object of the present work. We may, however, subjoin the following recently corrected table, showing the relative volume, mass, and density of the Sun and of the principal planets, the Earth's being represented by 1.

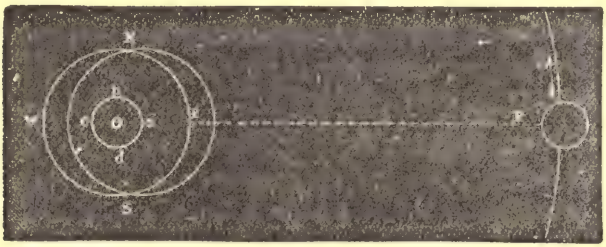
| Name. | Volume. | Mass. | Density. |
|---|---|---|---|
| The Sun . . | 1,245,126.00 | 311,281.00 | .25 |
| Mercury . . | .05 | .07 | 1.24 |
| Venus . . . | .85 | .79 | .92 |
| Earth. . . . | 1.00 | 1.00 | 1.00 |
| Mars . . . . | .14 | .12 | .96 |
| Jupiter. . . | 1,387.43 | 300.00 | .22 |
| Saturn . . . | 746.89 | 90.00 | .12 |
| Uranus. . . | 72.36 | 13.00 | .18 |
| Neptune . . | 98.66 | 17.00 | .17 |

We are now prepared to contemplate the main point in the first member of our Analogy, namely, the gravitating relation and connection of the Sun with each of the globes composing his great system. From the above table, the reader will not fail to observe the overwhelming superiority of this vast orb, both in mass and magnitude, over the largest member of his family,—that, stupendous as some of them are, he stands in the midst of them as a giant among pigmies.

Now, as the fundamental fact in the law of gravitation is, that every body of matter attracts every other body

with a force proportionate to its mass or weight, it follows of course that, while the Sun attracts every planet in the system, every planet in the system, in like manner, attracts the Sun with a force in proportion to its mass; and that while the Sun compels each planet to describe a circle around him, each planet compels the centre of the Sun to describe a similar circuit, but smaller in proportion as its mass is smaller than that of the Sun.

To make this perfectly plain we must refer to the annexed figure, in which the circle N W S E represents the globe of the Sun, and P, that of a planet. To simplify our explanation, we will suppose that the Sun is the only globe of matter in existence, and that presently, at




MOTION OF THE SUN'S CENTRE.

a given moment, the first planet is created, and placed at P. The instant this planet comes into being, it attracts the Sun towards it, drawing its centre as from *o* to *a*. As this planet advances in its orbit it exerts the same attractive force all along, so that when it comes to pull in the direction of N, the solar centre will be at *b*; when in the direction of W, it will be at *c*; and when in the direction of S, it will be at *d*; and so on till it arrives again at *a*. Thus in obedience to the attracting influence of this planet during its revolution, the central point of the Sun describes a complete round, as indicated by the small dotted circle, *a b c d*.

It is obvious hence, that no change in a planet's position in its orbit can take place without its producing an effect at the centre of the Sun—every league of its progress changes the position of that centre.

Nor could any change in its mass or weight take place without its being felt in like manner. If the mass should be augmented, or if it should be diminished, the measure of its attraction on the solar globe would be augmented or diminished in the same direct proportion.

Nor, once more, could any change in its distance take place without producing a similar effect. If, for example, the distance should be reduced by one-half, its attraction on the Sun would be increased fourfold; or, if it should be removed to twice the distance, it would be diminished to one-fourth; and so in the same inverse proportion for all other distances.

Now, what is true of this single planet is true in all these respects of every one of the planets composing the system as it exists. No change in the position, mass, or distance of one of them could take place without its being felt at the centre of the Sun. Not one of them can advance for an hour in its orbit, not one of them could be robbed of a ton of its weight, not one of them could be shifted a mile in its distance, but the occurrence would tell at the centre of the great globe. Yea, so unerringly is the balance of gravitation sustained, that it is no exaggeration to say, that if a man should lift a hammer and smite the rock before him, the blow would so disturb this delicate mystery as to be felt at the heart of the great solar orb, and even at the heart of every member of his great family of worlds.

## Teachings.

As the force of gravitation, which rules in the system of nature, is thus so evenly and finely balanced, that any

change in the position, mass, or distance of one of the planets would be felt at the centre of the Sun,—*so the Divine love, which reigns in the spiritual system, is so delicate and infallible that whatever affects the condition or interest of one member is felt at the heart of the Sun of Righteousness.*

Admirably sensitive and delicate as is the principle of gravitation, infinitely more so is the Saviour's love. Nothing can exceed, nothing can equal the affection, sympathy, and tenderness of Christ for his followers. No relation can be closer or more endearing than that he condescends to bear to his true disciples. He regards them as his chosen friends: "Ye are MY FRIENDS if ye do whatsoever I command you." But dear as is the name of friend, he assumes a dearer still: "And he stretched forth his hand toward his disciples, and said, Behold my mother and my brethren! For whosoever shall do the will of my Father which is in heaven, the same is MY BROTHER, and SISTER, and MOTHER." Every member of his spiritual kingdom stands in living connection with him—a connection so real and so vital as that of the head to the members of the body: "For he is the HEAD over all things to the church, which is HIS BODY." And more than even all this, such is his benignity, such the unsearchable riches of his grace and love, that he takes them into a divine union with himself: "I pray for them, that they all may be one: as thou, Father, art in me, and I in thee, that they also may be ONE IN US; that the world may believe that thou hast sent me. And the glory which thou gavest me, I have given them, that they may be one even as we are one; I IN THEM, and thou in me, that they may be made perfect in one. I have declared unto them thy name, that the love wherewith thou hast loved me may be in them, and I IN THEM."

"God is love; and he that dwelleth in love, dwelleth IN GOD, and GOD IN HIM."

Such being the close and endearing relation of Christ to his followers, how obvious and how certain that whatever affects their interests, or condition, for evil or for good, must also affect his loving heart. As the brain is connected with every member of the body, so his Divine Sensorium stands connected as by living nerves of sensation and sympathy with his every true disciple. They receive not a benefit, they enjoy not a blessing, but "he rejoices in his love over them." They suffer not a pang, they shed not a tear, they heave not a sigh, but it awakens its response of sympathy in his bosom: "he is touched with the feeling of their infirmity."

Are they oppressed, or wronged, or injured? He bids the world know that, "he that toucheth them toucheth the apple of HIS eye." Are they befriended and kindly entreated? He bids the world also know that, "he is not unrighteous to forget their works and labor of love which they have showed toward HIS name, in that they have ministered to his saints."

Are they sufferers in mind, or body, or estate? They have his heartfelt sympathy: "In all their affliction HE is afflicted."

Are they persecuted for righteousness' sake? He feels and accounts the persecution as directed against himself: "Saul, Saul," he cried from the heavens to that furious enemy of his people, "why persecutest thou ME?"

Are they in their labors of love, or in their weary travels, kindly received, and hospitably entertained? He esteems it, and will repay it, as kindness and hospitality extended to him in person: "He that receiveth you receiveth ME, and he that receiveth me receiveth him that sent me. He that receiveth a prophet in the name

of a prophet shall receive a prophet's reward; and he that receiveth a righteous man in the name of a righteous man shall receive a righteous man's reward. And whosoever shall give to drink to one of these little ones a cup of cold water only, in the name of a disciple, verily I say unto you, he shall in nowise lose his reward."

Are they neglected of men, left without aid or sympathy in time of need? It is to him all one as if they had neglected himself: "Inasmuch as ye did it not to one of the least of these, ye did it not to ME."

Are they remembered and cared for in the day of trouble? Are they destitute of the comforts or necessaries of life—of food or medicine, clothing or shelter—and any minister the same unto them? He esteems it as a personal kindness, and will reward it at the final day as if done to himself: "Come, ye blessed of my Father, inherit the kingdom prepared for you from the foundation of the world; for I was an hungered, and ye gave me meat; I was thirsty, and ye gave me drink; I was a stranger, and ye took me in; naked, and ye clothed me; I was sick, and ye visited me; I was in prison, and ye came unto me. Then shall the righteous answer him, saying, Lord, when saw we thee an hungered, and fed thee? or thirsty, and gave thee drink? When saw we thee a stranger, and took thee in? or naked, and clothed thee? Or when saw we thee sick, or in prison, and came unto thee? And the King shall answer and say unto them, Verily I say unto you, Inasmuch as ye have done it unto one of the least of these my brethren, ye have done it unto ME." Such is the love and such the sympathy that reign in the kingdom of grace; love so true and unfailing, and sympathy so tender, that whatever affects the condition or the interests of one of the least of the members of his great family is immediately felt at the heart of the Sun of Righteousness.

## ANALOGY VI.

*As a planet, though drawn by the attraction of other planets to this or that side of its true orbit, will yet be slowly but surely brought back to it by the more powerful gravitation of the Sun;—so the Christian, though drawn by the influence of other men to this or that side of the straight and narrow path, will surely in time be restored to it by the superior attraction of the Sun of Righteousness.*

### Phenomena.

The general motions of the planetary globes, as controlled and perpetuated by the Sun's gravitation simply, are plain and easily understood. But the Sun is not the only body in the system that gravitates; every one of the planets, as before stated, attracts the Sun and all the other planets in like manner; and hence arise various *perturbations* in their movements not so easily comprehended.

Were there no other bodies in existence but the Sun and *one planet*, the latter would describe an exact ellipse about the former, and continue to perform its revolutions in the same orbit forever; but the moment a *second* planet is introduced, this will draw the first out of its proper orbit, more or less, according to their relative position or distance; and when a *third* is called into being, this will disturb both the preceding, and both the preceding will disturb it; and thus on, with every additional planet.

In the existing system of nature, therefore, the planets, as they move in their orbits, thus necessarily attract one another according to the universal law of gravitation. When at their nearest distances from one another, their mutual disturbing influence becomes quite perceptible and calculable; and though this is small, yet if the

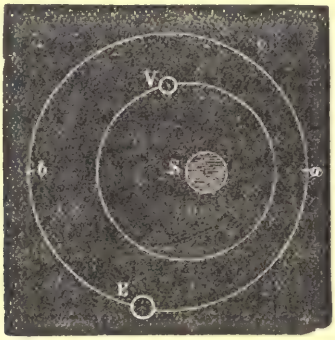
perturbations were to go on increasing with every recurrence, they would in the course of long periods of time, inevitably result in the destruction of the whole system. When these were first observed, astronomers naturally became alarmed for its safety, and thought that nothing but the direct interposition of the Almighty could save it. But as the science of physical astronomy advanced, and exact and prolonged observations were made, mathematicians became able to calculate and prove that, these perturbations, after reaching a certain limit or extent, gradually decreased until they came back to the point from which they began to deviate; that is, they were demonstrated to be periodical. Every planet after leaving, through these disturbing attractions, its mean path, or mean eccentricity, or mean inclination to the ecliptic, returns slowly to that mean, deviates from it on the other side, and again returns and passes to its former limit.

These perturbations, being numerous and in perpetual change, owing to the ever-varying distances of so many bodies of different masses, constitute one of the most difficult subjects in the whole domain of astronomy. But we hope to be able to convey to the reader a general idea of them sufficiently clear for our present purpose.

From the mutual attractions of the planets there result, as above intimated, three different classes of perturbations—the first relates to the orbits, the second to the eccentricities, and the third to the inclinations of the orbits of the planets.

1. *Perturbations of the orbits.*—The orbits of the planets are not circles, but ellipses; and the Sun is not, in any case, in the centre of the ellipse, but a little one side of it, in some more, in others less, on the longer diameter. Hence the orbits of two planets next to next approach each other at a certain point nearer than at any other

point. This will be understood by a glance at the annexed figure, where the outer circle represents, say, the earth's orbit, the inner that of Venus, and *a* the point of their least, and *b* that of their greatest distance. At *a*, of course, their mutual attraction and disturbance are greatest. We will suppose them to be at this point at a given time;—as they revolve around the Sun in periods of different lengths, when will they be for the first time in the same position again? It will be, as every arithmetician knows, at the date indicated by the least common multiple of these periods. Now, 8 times the period of the earth is not far from 13 times the period of Venus;




MUTUAL PERTURBATION OF TWO PLANETS.

but 235 times the period of the earth is almost exactly equal to 382 times the period of Venus. Hence they will be together again for the first time, at the point of their nearest approach, at the end of 235 times the period of the earth, that is, in 235 years. During one-half of this period the effect which one planet has upon the other is, that its orbit has been slowly changing in one direction, and during the other half has been coming back in the opposite direction: in other words, they have been so situated half the time as to retard, and the other half to accelerate each other's motion, according as the one has

been in advance or behind the other, during these numerous revolutions; so that at the end of this cycle, they are found just where they were at its beginning—no irregularity, either positive or negative, having accrued.

In a similar manner the planets Jupiter and Saturn affect each other. Five times the period of Jupiter is a little more than twice that of Saturn; but 77 revolutions of Jupiter are very nearly equal to 31 of Saturn, corresponding to a period of 913 years. Hence arises in the motion of both these planets a cycle of perturbations requiring over nine centuries to complete.

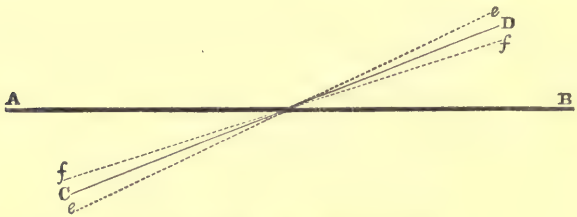
Again, there is a like inequality produced in the motions of Uranus and Neptune by their mutual attraction. The periodic time of Neptune is nearly double that of Uranus; or, more accurately, 25 revolutions of Neptune correspond to 49 of Uranus. Hence arises in the motions of these planets an inequality having a period of over 4,000 years.

The above instances will serve to convey an idea of the perturbations that take place in the motions of the planets in consequence of their mutual attractions.

2. *Variation of the inclinations.*—The planes of the orbits of all the planets are more or less inclined to the plane of the ecliptic; and these inclinations are subject to small variations—that is, they oscillate first to one side and then to the other of their mean inclination. To explain this, let the line A B represent the plane of the ecliptic, or that in which the Sun performs his apparent annual revolution; and C D the plane of a planet's orbit. This is found to swing forward very slowly till it takes the direction of the dotted line *ff;* it then returns till it has regained its former position, and passes on till it has reached the position of the dotted line *ee.* It now begins to swing back in the opposite direction, comes once more

to CD, and finally to *ff*, to go through the same round again. The entire oscillation, in every case, lies within the limits of a very small arc, and is accomplished with extreme slowness. It has been computed that the inclination of the orbit of Jupiter must oscillate between the values of 2° 2′ and 1° 17′, and that it requires for this change a period of 50,000 years. The oscillation of Saturn lies between 2° 32′ and 0° 46′, and occupies about the same length of time as that of Jupiter.

The plane of the earth's orbit is subject to a similar variation. The inclination of the earth's equator to the ecliptic is at present 24′ less than it was 2,100 years ago, and is now decreasing at the rate of half a second an-



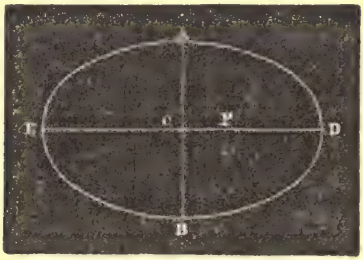

VARIATION OF INCLINATION.

nually. But it has been proved that this is a periodical variation, and that after reaching a minimum, it will return in a contrary direction; and thus oscillate back and forth about a mean position. It has been computed that the obliquity has been decreasing for 20,000 years, and will continue to decrease for 15,000 years longer; after this it will begin to increase and return.

3. *Variation of the eccentricities.*—The orbits of all the planets, as before stated, are slightly elliptical, having the Sun in one focus. The distance from the centre of the ellipse to this focus is called the eccentricity of a planet, and its amount is expressed as being such a fraction of the half of the diameter in which the focus is

situated. Thus, in the annexed figure, C is the centre, and F the focus. If the distance from C to F be $\frac{1}{2}$, or $\frac{3}{4}$, or $\frac{2}{3}$ of C D, the eccentricity is said to be 0.5, or 0.75, or 0.66, respectively. Now, the eccentricities of all the planetary orbits are continually changing, but this change is exceedingly small and slow, in no case exceeding one-thousandth part in three hundred years. In every instance these changes are confined within very moderate limits; those of Jupiter are confined to the limits 0.06 and 0.02; while those of Saturn lie within the limits of 0.08 and 0.01; the period in each case being 35,000 years.

The eccentricity of the earth's orbit is decreasing at the




VARIATION OF ECCENTRICITIES

rate of 0.00004 in a century; but this change will always be confined within the limits of 0.07 and 0.003. The earth's orbit, therefore, can never become an exact circle. Le Verrier has computed that the eccentricity will continue to diminish for 24,000 years, when its value will be 0.003. It will then begin to increase, and at the end of another period of 40,000 years its value will be 0.02; after which it will again slowly decrease.

All the foregoing perturbations and oscillations, and some others we have not named, result from the mutual attractions of the globes composing the system. And although so many bodies are concerned in producing them,

and though they occupy, in completing their cycles, such vast periods of time—some of them thousands and others tens of thousands of years—yet are they not less sure and fixed in their return, than the swinging of the pendulum, whose regulated motion marks seconds of time.

But when these perturbations and oscillations of the planetary bodies were first discovered, and before their nature was understood, Newton, Halley, and others became alarmed for the stability of the system. They thought they had detected a weak point, a fatal defect, in its constitution. They could clearly discern that, if all this went on ever increasing, as they thought it must, the whole frame of nature would ultimately be involved in inevitable ruin. But vain fears! The Divine Architect had foreseen all the difficulties and dangers they apprehended, and had fully provided against them, by establishing such a balance of the disturbing forces as would make them, as we have just seen, *self-correcting* within fixed and regular periods. To the successors of these great men—Lagrange, Laplace, and Poisson—it was given to discover all this. They were enabled to unravel these complicated variations and disturbances, to explain their causes, to calculate their periods, and to determine their limits; and thus to demonstrate that the system of nature remains stable and enduring.

These distinguished astronomers wrought out, on the most rigorous principles of mathematics, a demonstration that the original constitution of the solar system embraces all the conditions essential to its security. They clearly proved that superiority of mass in the central orb, certain distances between the globes encircling it, limited eccentricities to their orbits, small inclination of these to one another, and revolution in the same direction—are conditions essential to the stability of any system

governed by the law of gravitation. And these all are found in the most admirable combination in the solar system.

What a revelation, then, of the perfection of the Creator's works have we here! How vast in dimensions, how sublime in periods, how infallible and enduring in movements! In this great system we behold scores of immense globes—the distance, mass, and velocity of every one of these must be in their exact proportions, all must rotate and revolve in the same direction, the orbits of all must be set at so many degrees and minutes of inclination to all the rest, every one must be bound within such limits of eccentricity, and the disturbing attraction of each upon all the others must be uniformly and statedly corrected. An error in one of these particulars might involve all in destruction. If the eccentricity of Jupiter were increased to that of Mercury, or the mass of Saturn given to Venus, all security for the stability of the system would at once vanish. Whence, then, all these admirable adjustments, and proportions, and balancings of a hundred different worlds? Whence but from the hands of HIM who is infinite in knowledge, and skill, and power? What clearer evidences, or what stronger proof of this could be given or desired than we behold in the facts now presented? Who can intelligently contemplate the beauty and perfection of the planetary system, and not in profoundest reverence look up, and say, "These, O Lord, are thy works, and marvellous they are in our eyes!"

## TEACHINGS.

Every object we behold in nature, every force we detect in activity, and every law we find to prevail, whether in the heavens or on the earth, has some sacred message, some important lesson for man. In these we discover

thoughts that have occupied the Divine mind, plans that indicate the Divine character, and operations that confirm the Divine promises. That aspect of the system of nature, at which we have now glanced, rightly understood, is even luminous with the same precious truths as we read in the Gospel of the Son of God.

As a planet, though drawn by the attraction of other planets to this or that side of its true orbit, will yet be slowly but surely brought back to it by the more powerful gravitation of the Sun,—*so the Christian, though drawn by the influence of other men to this or that side of the narrow path, will surely in time be restored to it by the superior attraction of the Sun of Righteousness.*

The perfection of all the plans and works of God gives assurance of this. Not one of these faileth, for that he is strong in power and infinite in understanding. If the system of nature, the mere *abode* of immortal intelligences, displays such unfailing skill and security, as we have just seen, can we suppose that the system of divine grace, upon which depend the eternal welfare, felicity, and glory of those intelligences is less perfect, or less effectual and sure? That were contrary to reason—that were to set a higher value on the material dwelling than upon the spiritual being that occupies it—that were, indeed, a base reflection upon the perfections of the Almighty. If the solar scheme were so ill-contrived that now a planet, and now a satellite were to break loose from its bonds, forsake its orbit, and become a lost wanderer in the trackless void, might it not well be regarded as a reflection upon the wisdom and skill of the Creator as not being adequate to contrive, or upon his power as not being able to produce a system harmonious, and stable, and enduring in its motions?

How much more base, then, would be the reflection,

to suppose that, the system of moral and gracious means, devised and executed for man's salvation, is so imperfect and uncertain as that one after another of the souls who have been once set in motion, as so many spiritual planets, around the Sun of Righteousness, should after a few revolutions, renounce their allegiance to him, forsake their courses, and become hopeless and perishing wanderers in the dark deep of sin and misery. The works of the Lord are perfect; his plans are unfailing, and his promises are all yea and amen. "Being confident of this very thing," saith the apostle, "that he who hath begun a good work in you will perform it until the day of Jesus Christ."

As the all-wise Creator, while as yet he had not made the earth, nor the fields, nor the highest part of the dust of the world, nor prepared the heavens, nor set a compass upon the face of the deep, clearly foresaw the disturbing attractions which would affect the positions and motions of all the planets through every inch of their ceaseless revolutions, and planned effectual means, as we see at this day, for their preservation and stability—so the Holy Redeemer, in the beginning of his way, before his works of old, foresaw the position which each of his unborn followers would occupy, and all the influences which should beset them from the cradle to the grave, and made ample and effectual provisions for their safety. "He determined their times, and the bounds of their habitation." "I am God, and there is none like me, declaring the end from the beginning, and from ancient times the things that are not yet done, saying, My counsel shall stand, and I will do all my pleasure. Yea, I have spoken it, I will also bring it to pass; I have purposed it, I will also do it."

The safety of a planet depends not upon itself—not

upon its size or mass, not upon its hold or gravitation upon the Sun—but upon the Sun's hold and gravitation upon it. So long as the Sun endures, therefore, exerting his superior and unremitting attraction, that planet is safe amid all the disturbing forces that may affect it. So with the Christian believer—his safety depends not upon himself; not on the firmness of his will, or the ardency of his affection, or the fixedness of his purpose; but on the grace of the Lord Jesus Christ, enlightening and strengthening him in the inner man, quickening his faith and love, and drawing him to that which is right and pure and holy. So long, then, as Christ sits upon the throne of his glory, supreme in authority and omnipotent in power, the believer's ultimate safety is ensured, whatever temptations or enemies may assail him. "Because I live, ye shall live also. I know my sheep and am known of mine. I give unto them eternal life, and they shall never perish, neither shall any pluck them out of my hand. My Father which gave them me is greater than all; and no man is able to pluck them out of my Father's hand. I and my Father are one."

The planet, though drawn through the perturbating influence of others more or less out of its orbit, yet through the controlling power of the central orb, is sure to be restored in due time from all its deviations and obliquities. So the believer—like Noah, through ignorance; or like David, through lust; or like Thomas, through unbelief; or like Peter, through fear—may be led astray for a season; but like these also he will assuredly be restored to the right way, through the unfailing attraction and governance of the Sun of Righteousness. "I will never leave thee, nor forsake thee," is his promise. And hath he said it, and shall he not do it? "Lift up your eyes on high, and behold who hath

created these things, that bringeth out their host by number: He calleth them all by names by the greatness of his might, for that he is strong in power; *not one faileth.*" Of the spiritual stars predestined to adorn and enrich his crown, assuredly, therefore, not one shall fail.

But while those who in this life hear and believe and obey the truth are thus secured and saved, what will be the lot or destiny of others—of those numbers who reject the Gospel, and of those myriads who never heard the name of Christ,—embracing by far the vast majority of our Race? Are all these to be left "wandering stars" forever and forever? Is there no law, no counteracting influence established that will eventually work out their restoration to their true orbits in the moral system? Are there no redemptive agencies provided that will finally avail with and for them? Are there no elements of love, or compassion, or mercy involved in the great plan of salvation, that will ultimately reach and restore even these to loyalty, love and happiness? Is there no door of *hope* left open concerning them?

Who shall presume to "limit the Holy One of Israel?" For the full solution of this problem we must wait; and well we may; for as in the material, so in the moral system, all the Divine arrangements, we may rest assured, will be found perfect and complete, the wisest and the best. The revolutions of the latter, like the cycles of the former, may occupy periods for their completion, that are vast, indeed, as compared with the life-time of the creature of a day. In the present state, it is given to man to see or to know but a limited fragment of the sublime and glorious plan of Divine Grace, which spans the ages and the eons of the reign of Messiah. And all this is in harmony with our knowledge of other doings of the Ancient of Days, who is in no haste to accomplish his inscrutable purposes, seeing "He inhabiteth eternity."

Man, in the present life, is, every day, every hour, enjoying the results of material laws and forces which were set in operation thousands of years, aye and of ages, before he was called into existence. Our globe has known what geologists call its Glacial Period—a period of cold and storms, of darkness and desolation, which required tens of thousands of years to effect its purposes, and ultimately to introduce the bright and happy period in which we live. And the whole material system to which our globe belongs, as we have just seen, has its secular perturbations—its deviations of orbits and oscillations of centres and inclinations, which continue, yea, go on increasing, for thousands and tens of thousands of revolutions; and then, in the course of as many other revolutions, return slowly but infallibly to their perfect equilibrium. Now, if such vicissitudes and such variations in the system of nature are ultimately corrected by the laws and relations under which Infinite Wisdom has placed them, may we not hope that equally effective provisions have been made also for correcting the far more fearful disorders of the intelligent universe? And if the restoration of material derangements requires such enormous periods, analogy would suggest that similar periods may be necessary for the vindication of moral laws and the carrying out of gracious plans, instituted from the creation of man, yea, from the depths of eternity. If each oscillation of the celestial mechanism requires a period, in comparison with which the brief and hasty life of man sinks as to a moment or point of time, patiently and confidingly should we wait the results that are to issue from the evolutions of that mighty and amazing scheme of love, into which the very angels desire to look. And, as the evil of sin is of our own creation, all the *more patiently*—rejoicing in the thought, that in proportion to the length of the time

which the process may demand, will be the magnitude of the results accruing to the interests of holiness and to the glory of God.

We may not say, for we have no warrant to do so, that *all* the resources of the All-Sufficient, to rescue and restore erring men, are *exhausted* in the few and evil days of the present life. That were to be wise above what is written. That were to set bounds to the INFINITE. The depths of his wisdom and the riches of his grace are unfathomable. "His judgments are a great deep, and his ways past finding out." "His love passeth all understanding." "His compassions fail not." "His mercy endureth for ever." Without supposing, then, or even implying, that salvation is or ever will be attainable in any other way than through the atoning blood of Christ, or that repentance, faith and submission are not essential conditions—without denying a final judgment, without doubting the future punishment of sin, or conflicting with any explicit statement of scripture—may we not entertain the hope that, in harmony with the processes of recovery and restoration we witness throughout the universe, the time will come—its date, indeed, may lie far and deep in the future—when all evil will be remedied, every sin forgiven, and every heart a channel through which a fulness of delight shall ever stream from the Great Central Source, the ever-blessed SUN OF RIGHTEOUSNESS?—"Then shall he deliver up the kingdom to God, even the Father; when he shall have put down all rule and all authority and power: for he must reign till he hath put all enemies under his feet."

## ANALOGY VII.

*As the Sun, by his all-pervading gravitation, brings forward all the globes of the system to every position and point in their circuits, at the exact and predicted moment; so the Sun of Righteousness, by his all-embracing providence, brings forward every event relating to his church and the world at the precise time afore appointed.*

### PHENOMENA.

THE scales used for weighing gold in the assay office, at New York, are said to be so delicate that when brought to a balance with two pieces of paper of equal size in the pans, the mere writing of a name with a lead-pencil on one of the pieces of paper will add enough weight to the paper to turn the scales in its favor. Admirable as this is, infinitely more so are the scales of gravitation, in which a floating mote or a flying planet is weighed with equal delicacy and precision. Not a grain of sand, not the minutest atom, could be added to, or taken from, a globe in the solar system, but the balance of the Sun's gravitation would detect the change, and modify its action accordingly. And this is not the only respect in which it excels the contrivance of man; that, by its very delicacy, will wear, grow inaccurate, and fail to answer its purpose; but gravitation is an agency that knows neither wear, nor tear, nor derangement; it is as effective and perfect in its action to-day as when the world was first poised in empty space. It has never been a moment behind, nor a moment in advance, in carrying through their rounds any of the great globes committed to its guidance and control. In all its operations, it has ever proved undeviating and infallible. In proof as well as illustration of these statements, let us now glance at a few well-established facts.

The Sun and moon, as every one knows, are both sub-

ject to eclipses, varying in extent and duration. These take place when the moon is in certain positions in her orbit with reference to the earth and the Sun; in other words, when all these three globes happen to be in one and the same straight line, which occurs at irregular intervals. Now, so exact and uniform is the action of gravitation on the motion of both the moon and the earth, that each eclipse may be, and, in fact, has been calculated for scores and even hundreds of years in advance, with absolute certainty and correctness. The astronomical observer of these phenomena, take up his position on whatever spot of the earth's surface he may, knows the precise minute and second at which to look for their commencement and their close, and knows also what side and what proportion of the disc of either luminary will be obscured in every particular case. So unerring is gravitation that it has never failed to bring about an eclipse at the very moment when it was due.

Again, if we look at the revolutions of the planets in their orbits we shall find the same infallible exactitude. Our own globe, for example, in its annual course around the Sun sweeps over a circumference measuring 575 millions of miles; and yet it performs this mighty journey from year to year, and from century to century, without fail, and without the least deviation—namely, in 365d. 6h. 9m. 9.6sec. This is the sidereal year. How marvellous is this fact! and yet not more marvellous than important to the welfare of our whole world. It might seem, at first thought, a trivial matter, if the earth had fallen behind its intended speed, say, just one minute, in running a million of miles; but if even that small loss had actually taken place, all terrestrial arrangements of seasons and temperature had long since run into utter confusion, and our globe been rendered uninhabitable.

Take again the planet Jupiter, whose orbital journey far exceeds that of the earth, amounting to no less than 2,988 millions of miles; and yet this stupendous distance is accomplished without fail from revolution to revolution within its set time—namely, 4,332d. 14h. 2m. And those more remote orbs, Saturn, Uranus, and Neptune, perform vastly longer journeys still, but with the same unfailing precision. Thus, that mysterious power, gravitation, carries every globe of the system, whether great or small, near or afar off, through its appointed round in its exact period of time; when the moment of its perihelion or aphelion point is called, it is there, and promptly answers, "Behold, here I am."

As another and somewhat different illustration of this subject, we may view what are called the transits of the inferior planets. The orbits of Venus and Mercury being within that of the earth, these planets, at distant and unequal periods, pass exactly between us and the Sun, and appear as black spots passing over his disc; and these passages are therefore called transits. Let us take those of Venus. The first of these ever known to have been seen by a human being occurred December 4th, 1639. A second was observed in 1761, and a third in 1769. The last was deemed of such importance, as being the best means known for determining the distance of the Sun, that expeditions were fitted out on the most effective scale, by the British, French and Russian governments, to the remotest corners of the globe, for the purpose of observing it. And though these observations were made with as great accuracy as the state of science and the instruments possessed at the time would admit, yet in many respects they were not satisfactory to subsequent astronomers; and hence scientists ere long began to look forward to a recurrence of the phenomenon with great

interest. But another transit of this planet would not take place till 1874. So that before another opportunity for observation would occur, the earth would have to perform 105 revolutions round the Sun, and Venus no less than 171 revolutions. Yet, such is the exact and infallible action of the Sun's gravitation that, after all these twofold revolutions had been completed, not the slightest amount of gain or loss of time had accumulated; the transit came to pass at the precise hour and instant astronomers had fore-calculated—namely, December 8th, 1874, the first contact taking place at 16h. 8m. 24sec.; and according to their computations, also, its duration proved to be just 4h. 9m. 22sec. As we contemplate such a result as this, we scarce know which to admire the most, the perfection of Nature's laws, or the intellectual powers bestowed on such a diminutive creature as man, which enable him to trace and calculate such intricate revolutions at the distance of so many millions of miles, and through so many years to come!—The last transit of Venus occurred on the 6th of December, 1882.

We have in the solar system another class of bodies which afford a more striking illustration still, if possible, of the subject before us. These are the comets—wild wanderers—despisers of all fixed limits. Unlike the planets, which all move from west to east, and nearly in the plane of the ecliptic, these cut across that plane at every possible angle, altogether indifferent as to the degree of their inclination, and equally indifferent to the direction in which they travel, the motions of quite as many being retrograde as direct. They move round the Sun, indeed, as their centre, but in elliptic orbits immensely elongated; in one part of which some of them travel with inconceivable speed, while in the opposite they progress slowly, almost as the floating vapor before the

breeze. But the Sun controls the movements of all these wanderers by the very same force, and according to the very same law, which retains the planets in their orbits and carries them forward through their rounds—the marvellous law of gravitation.

"The great comet of 1680," says Herschel, "afforded Newton a beautiful occasion to test the truth of his gravitation theory by the most extreme case which could be proposed. The planets were tame and gentle things to deal with. A little tightening of the rein here and a little relaxation there, as they careered round and round, would suffice perhaps to keep them regular, and guide them in their graceful and smooth evolutions. But here we had a stranger from afar—from out beyond the extremest limits of our system—dashing in, scorning all their conventions, cutting across all their orbits, and rushing like some wild infuriated thing close up to the central Sun, and steering short round it in a sharp and violent curve with a speed (for such it was) of 1,200,000 miles an hour at the turning point, and then going off as if curbed by the guidance of a firm and steady leading rein, held by a powerful hand, in a path exactly similar to that of its arrival, with perfect regularity and beautiful precision; in conformity to a rule which required not the smallest alteration in its working to make it applicable to such a case. If anything could carry conviction to men's minds of the truth of a theory, it was this. And it did so."*

In 1682, another magnificent comet appeared in the heavens. In this, Edmund Halley, the friend of Newton, took a special interest, and undertook to determine its orbit and its period. Having completed his laborious calculations, he announced to the world that it would return, and appear again in the beginning of the year

* *Familiar Lectures*, p. 108.

1759, thus giving it a period of seventy-six years. This prediction was verified; at the time foretold it did return —but returned to look down on the grave of the intrepid mortal who had traced its mystic path through the void profound! It appeared again in 1835, thus reassuring the correctness of his calculation. This comet, at its perihelion or nearest point, is within 55,000,000 of miles from the Sun; but in reaching its aphelion or furthest point, it crosses the orbits of all the planets, passing beyond that of Neptune, the outermost, not less than 650,000,000 of miles; yet from this inconceivable distance the Sun's attraction brings it back steadily and uniformly to complete its circuit in 27,865¾ days, or 76.29 years.

The periods of a number of other comets have been calculated, and which have been verified in like manner by their return once and again. The periods of others still have been computed, but ere the actual verification of these shall take place ages upon ages must pass away. The period of the comet of 1858 has been estimated to be 2,100 years; that of 1811, to be 3,000 years; and that of 1844, 100,000 years. Others there have appeared whose courses indicated longer periods still. But time affects not the energy or the law of the Sun's gravitation, and each at its appointed day will assuredly be brought back again to the point where human eyes first beheld it. "Not one shall fail."

From the foregoing examples we see what an infallible ruler and guide the great solar orb is;—that it brings every planet, and satellite, and comet in his vast system forward to each particular point of its orbit at the very time appointed. Every eclipse and every transit, every conjunction and opposition, every quadrature and occultation, after journeys of millions and hundreds of millions of miles, takes place at the very hour, and minute, and second

when it is due. And as we contemplate this perfection of nature's laws and nature's forces, we are involuntarily moved to exclaim with the devout Psalmist, "Thy word, O Lord, is settled in the heavens; they continue this day according to thine ordinances, for all are thy servants."

And with such facts as those above before us, we can scarcely escape the reflection, What triumphs the human intellect has achieved! What a thing it is for diminutive man, the creature of a few years' existence, to measure the distances, trace the orbits, weigh the masses, compute the velocities, and determine the periods of worlds on worlds so vast and so remote! And as we gaze on one of those mysterious visitants, the comets, whose period far outspans that of his brief and hasty life, and think that it will return again to verify his calculations, and to proclaim the victories of his science, not to himself, but to the generations that are yet to be born far hence —the thought rushes with instinctive conviction into the mind, Surely such a being must be immortal! Shall these unconscious things remain, and continue to come and go, and the reasoning MIND, that could pursue, and grasp, and comprehend them, sink and fade into utter nonentity after a few fleeting days? It cannot be. Man's nature, and man's intellectual achievements, proclaim alike that he must live on, and live forever. "Is it possible," asks an eloquent writer—"is it possible that it should be otherwise in the government of God? Shall the material thing, inorganic, inert, impercipient, move on in this wondrous perpetuity; and shall the soul which discerns its order and tracks its career, and detects its laws, and speculates on its constitution, be swept away as nothing before it? Shall unconscious matter last, while the mind, to which alone its functions are subservient, which interprets its mysteries, and reads in them the

signature of God, vanish like a passing wind? Shall the knowledge and the thoughts of men be handed down in endless genealogy, teaching and inspiring the souls of other times; and shall the conscious creature which called them into being be blotted ignominiously from creation? Impossible! It cannot be, but that *they*, through the medium of whose thought we now gaze at the skies, witness elsewhere the excellence of their past toils, the triumphs of their studious meditations. Surely the heavens which they deciphered, they behold with eyes undimmed by age, and minds yet yearning, but in a spirit of profounder adoration, to press forward towards vaster disclosures of the infinitude of God."

## Teachings.

As the Sun, by his all-pervading gravitation, brings forward all the globes of the system to every position and point in their circuits, at the exact and predicted moment; —*so the Sun of Righteousness, by his all-embracing providence, brings forward every event relating to his church and the world, at the precise time afore appointed.*

Science has no better proof to offer of its truth and certainty than its conferring on its votaries the power of foretelling issues or results. The chemist can give no evidence more convincing of the soundness of his knowledge than by announcing beforehand what will follow the combination of certain gases, or what will be the distinctive product of the union of certain elements. And the astronomer can supply no demonstration so conclusive and irresistible of the correctness of the Copernican system, and of the truth of Newton's laws of motion and gravitation, as his predictions of the movements of the planets, the time of eclipses, the occurrence of transits, and the return of long absent comets. Even

so, no stronger proof of the truth and divine origin of the Holy Scriptures could be given or desired than the fulfilment or verification of the numerous and diversified predictions which are found in them. Holy men of old —not by superior sagacity to discern the tendency of any laws of moral gravitation, or by clearer intellect to apply any principles of the political calculus, but—by *inspiration of God*, were enabled to predict coming events, coming changes and revolutions, judgments and mercies; the rise and fall of nations; the careers of ruthless conquerors; the growth, glory and decline of proud and opulent cities; the appearing of timely deliverers or illustrious benefactors of mankind, who should be as the rising of unsullied orbs shedding holy light far and wide over the face of earth. And lo! all these have been brought to pass, even at the time and in the manner they were foretold. And this bears a testimony, such as nothing else can, to the verity and heavenly origin of the records in which these marvellous predictions now are found. Thus religion has proofs positive of the same nature and order as those which establish the most exact of our sciences.

In order to appreciate these proofs more fully, let us now look at a few of them a little in detail.

The fallen race of men, waxing worse and worse through the first period of their probation, and having proved themselves utterly incorrigible, nothing seemed to remain but their extermination from the face of the earth. Hence it was clearly foretold what their fate would be: "My Spirit shall not always strive with man, for that he also is flesh. I will destroy man whom I have created from the face of the earth. Yet, his days shall be an hundred and twenty years."* When these years of further forbearance shall have expired, being found still

* Genesis vi. 3, 7.

unrepentant, the threatened judgments will as surely descend as the forecast eclipse of the Sun or moon will come to pass. And it was even so. "In the six hundredth year of Noah's life, in the second month, the seventeenth day of the month, the same day were all the fountains of the great deep broken up, and the windows of heaven were opened. And the waters prevailed exceedingly upon the earth; and all the high hills, that were under the whole heaven, were covered. And all flesh died that moved upon the earth." So punctually and so signally did providence fulfil the word of prophecy which had gone before. And the fearful catastrophe so strongly and lastingly impressed itself on the mind of the Race that it has never been forgotten, but has lived and floated down through all the ages, in one form or another, in the traditions and writings of every branch of the human family. The mythologies and histories of the ancient nations are full of the remembrances of it. In every region and in every clime of the globe the traveller meets with traces or traditions of the Flood, the Ark, and the rescue of the Favored Few.

The waters of the deluge having passed away, and the whole earth being left before the family of Noah, God revealed to him the division he purposed to make of it among the descendants of his three sons. "And he said, Cursed be Canaan; a servant of servants shall he be unto his brethren. And he said, Blessed be the Lord God of Shem; and Canaan shall be his servant. God shall enlarge Japheth, and he shall dwell in the tents of Shem; and Canaan shall be his servant."* Shortly after this prophetic utterance we read that the descendants of Japheth had for their territory the whole of Europe and its surrounding islands: "By these were the

* Genesis ix. 25–27.

isles of the Gentiles divided in their lands; every one after his tongue, after their families, in their nations." The children of Ham had for their inheritance south-western Asia and adjoining Africa: "And the sons of Ham . . . spread abroad; and the border of the Canaanites was from Sidon." And the descendants of Shem had their home in the East: "And their dwelling was from Mesha, as thou goest unto Sephar, a mount of the East." Thus, the respective territories of Japheth, Ham and Shem are distinctly outlined; and, after innumerable changes, these old distinctions remain deep and clear to this day. And now let us look at the particulars of the prophecy before us, and see how they have been fulfilled.

The descendants of Ham, the father of Canaan, were to be "servants of servants," that is, the lowest and basest of servants. Literally, indeed, has this prediction been fulfilled. The continent of Africa was peopled principally by the children of Ham; and who that has traced the history of that great division of the globe but knows that it is for the most part a history of subjection, servitude, and degradation? In what ignorance, barbarity, slavery and misery has the greater part of it lain for ages upon ages! And what multitudes of its inhabitants, in all periods, have been driven as beasts to be sold in the market, and thence conveyed to do the work of beasts for the other branches of the human family.

Again: "God shall enlarge Japheth." And it was so done. The territories that came into the possession of Japheth were truly very extensive. Besides the whole of Europe and its numerous isles, they inherited Lesser Asia, Media, part of Armenia, Iberia, Albania, and those vast regions towards the north, which anciently were occupied by the Scythians, but at present by the Tartars. And to this day God is enlarging Japheth; witness the

vast colonies of his descendants in modern times, how they have taken possession of North and South America, the West Indies, Southern Africa, Australia, New Zealand, and many other islands of the world.

And again: "And he shall dwell in the tents of Shem," that is, God shall dwell. And so it pleased the Most High to do in a signal manner. The most distinguished branch of Shem's family were the Hebrews; and the prediction was fulfilled when the *Shechinah*, or Divine Presence, rested on the Ark, and dwelt in the Tabernacle, and the Temple of the Jews, and pre-eminently when, in an after age, the Word who was with God, and was God, pitched his tent, and "dwelt among them."—Thus the providence of him, who guides the stars in their courses, guided each of these branches of Noah's family, through all their wanderings, to rest in their respective and allotted habitations.

Notwithstanding the appalling judgment of the deluge, and the displeasure of God against the wicked and his regard for the righteous displayed therein, mankind, as they multiplied, rapidly sank into the same depths of darkness, iniquity, and idolatry as before. And to preserve the knowledge and worship of the true and living God in the world, the great Father of all resolved to choose one family, and place it under a special dispensation of grace and mercy, for this end. The head of this family was Abraham. To that faithful patriarch it was said, "In thee shall all the families of the earth be blessed. Know of a surety that thy seed shall be a stranger in a land that is not theirs, and shall serve them; and they shall afflict them four hundred years; and also that nation, whom they shall serve, will I judge; and afterward shall they come out with great substance."* All this was promised when as yet Abraham

* Genesis xii. 3, and xv. 13, 14.

had no seed, no, not even a child; yet as time rolled on through these successive centuries, particular after particular was infallibly brought to pass until all was fulfilled. Thirty years after, the promised son was born to him—his seed increased and multiplied rapidly—by a chain of marked providences they were led down to Egypt, and dwelt there—there, in the process of events, they became bondmen, and were long sorely afflicted. But the providence that was over them was unslumbering; in the fulness of time, by a series of stupendous miracles, they were delivered out of the hands of the Egyptians, and brought up out of the land of their bondage. And thus according to the exact words of the Lord to Abraham, "It came to pass at the end of the 430 years, even the self-same day it came to pass, that the hosts of the Lord went out from the land of Egypt." And they took with them, not only "jewels of silver, and jewels of gold, and raiments," but also "flocks and herds, even very much cattle." So punctually and so completely did the Divine Providence bring about all that was promised to the "father of the faithful."

In the dying words of Jacob we have another remarkable prophecy; it is concerning the destiny of his twelve sons, or rather of their posterity. *And Jacob called unto his sons, and said, Gather yourselves together, that I may tell you that which shall befall you in the last days.** Being assembled, he addressed them individually, and described the territories which they would respectively occupy when come to the promised land, and also their respective characters and histories down to the latest era of the Jewish polity. To speak of each of these predictions in detail would carry us altogether beyond our prescribed limits. Suffice it therefore to say, that the subsequent

* Genesis xlix. 1–28.

career of each tribe presents a literal and complete fulfilment of these prophetic utterances. When Joshua, 250 years after, divided the land of Canaan among them by lot, the lot so fell out, in each case, as to be in perfect accord with the words of the dying patriarch; and the character which each tribe developed in passing through its predicted vicissitudes proved equally in harmony with the same. Some learned men, particularly General Vallancy and Dr. Hales, have attempted to trace out an analogy or resemblance between the twelve tribes and the twelve signs of the Zodiac; but whatever may be thought of such curious comparisons, certain it is, that the Sun does not move forward through the circles of these signs more steadily or more certainly than did providence carry each of these tribes through the course here foretold.

Shortly before Moses, at the command of God, ascended the mount where he was to lie down and die, he delivered a series of most explicit predictions concerning the future conduct and history of the Israelites as a nation. Striking as these predictions are, and remarkable as has been their fulfilment, space will not allow us to dwell upon them in particular. In brief, he plainly foretold them, what particular calamities would befall them for their defection from the faith and worship of Jehovah—the characteristics of the nations that would subjugate and oppress them—the horrors of the invasions and sieges which they should endure—how they should be rooted out of the land which they were then about to possess—how they should be sold as slaves, and scattered over the face of the earth—how they should be afflicted and tormented in all the countries whither they should be driven—and how they should become an astonishment, and a proverb, and a by-word among all nations.* In a

*See Deut. xxviii. and xxix.

word, so full and clear is this prophecy that it may be regarded as a historic chart of that people, as it agrees in every particular with their subsequent written history down to the present day. Its fulfilment, like a map of the midnight heavens, stands a naked and undisputed fact before the eyes of the world.

Passing by numerous predictions of a minor character, we may next notice a few which relate to the most prominent objects in human history. The prophet Nahum foretold the utter destruction of the city of Nineveh, while it yet stood in all its strength and wealth and splendor—that it should be demolished partly by fire and partly by an overwhelming flood—that it should be taken during a general drunken carousal—that vast spoils of silver and gold and pleasant furniture should be carried away from it—and that it should be made a desolation forever. And the heathen historians Diodorus Siculus and Lucian, who knew nothing of the Hebrew prophet, *unconsciously* record the fulfilment of these predictions to their minutest particulars. And the relics and records lately exhumed from its ruins, after having lain buried for twenty-five hundred years, offer a most wonderful confirmation of both.

The doom of Babylon in like manner was clearly foretold by both Isaiah and Jeremiah, while it was even at the zenith of its glory. The Medes and Persians would unite their forces against it—its defenders would lose courage and become as women—its river would be dried up and the enemy enter by its channel—it should be captured in the night and during a great festival—it should remain in the hands of its captors, but change masters once and again—its magnificence should fade and its glory depart—and ultimately its destruction should be rendered as complete as that of Sodom and Gomorrah

BABYLON, THE GLORY OF KINGDOMS, THE BEAUTY OF THE CHALDEES EXCELLENCY [illegible]
SODOM AND GOMORRAH

—beasts of the desert should lie down in it, and doleful creatures occupy its pleasant houses—pools of water should rest over its site—and none should dwell in it from generation to generation. And the all-embracing providence of heaven, in its steady march and unfailing agency, brought all these things to pass in their appointed times. That these predictions were fulfilled to the very letter, we have the abundant testimony of Herodotus, Xenophon, Quintus Curtius, Pliny, and Plutarch, among the ancients; and of a multitude of travellers and explorers, in modern times, who have visited and examined its mighty ruins.

The fate of Tyre, also, the mart of nations, the city of merchant princes, while yet in the height of its opulence and power, and 125 years before it came to pass, was clearly foretold, both by Isaiah and Ezekiel. "*Behold*," says the latter, "he will smite her power in the sea, and she shall be devoured with fire. They shall lay thy stones, and thy timber, and thy dust, in the midst of the water. I will also scrape her dust from her. Thou shalt be sought for, yet thou shalt never be found again." And all this, too, came to pass as attested by Curtius, Josephus, Arrianus, Plutarch and others. Old Tyre was taken and destroyed by Nebuchadnezzar; and 240 years after, Alexander besieged New Tyre, which was situated on an island; and to reach and attack it he formed a mound across the channel which separated it from the main land, using for its construction all the ruins and rubbish of the old city, and in this way fulfilling to the very letter the words of the prophet, "They shall lay thy stones and thy timber and thy dust in the midst of the water."—Thus these mighty cities, and others like them, which once flourished at the zenith of earthly glory, were destined within their determinate time, according

to the sure word of prophecy, to decline and set, like unholy stars, to rise no more.

Descending still with the course of time, we come to prophecies in the book of Daniel as definite and certain as the predictions of the astronomer's calculations. Among these is this remarkable one (chap. vii.)—that four Great Monarchies or Empires should successively arise to rule the world. These are announced under the figures of so many great and symbolical "beasts." The first would be as a *winged lion;* royal, strong, courageous; rapid in its conquests and extensive in its territories; but whose progress after a time would be checked, its strength weakened, and the dominion would pass into the hands of another people and another line of rulers. These would be less noble in their character; their spirit and practices would be more like those of the *bear;* rough and ferocious; crunching the bones and devouring the flesh of the neighboring nations. In its turn this dynasty likewise would be overthrown, and succeeded by a conqueror, whose movements would be so sudden and victorious, marches so swift as to be comparable only to a lithe *leopard having four wings;* but his career would be of short duration; and his vast dominions would soon be divided into four inferior kingdoms. After these would arise another empire, powerful and cruel and irresistible, likened unto *a beast dreadful and terrible, and strong exceedingly, having great iron teeth, and devouring and breaking in pieces, and stamping under its feet* all that opposed or stood in its way to universal dominion; but the time would come when this immense empire, like the preceding, would be divided into no less than ten petty kingdoms; and thus would its power decline and its glory fade away. Such, in brief, are these remarkable predictions, whose scenes and revolutions extend over a

period of more than a thousand years. And no one who possesses the slightest acquaintance with history can fail to discover that the subjects to which they refer are the Chaldean, the Medo-Persian, the Grecian and the Roman empires, and that all the particulars which they embrace have been literally fulfilled. In fact they present the great outlines of the actual history of this long succession of ages, the rest being the mere filling up of the parts. The astronomer could not more accurately describe the figures, or foretell the order and the times of the rising and setting of the great constellations of heaven, than the prophet has the character and the rise and fall of these great kingdoms of the earth.

Another notable prediction of Daniel is that concerning the advent of the Messiah, in which are stated the exact number of years till his appearance as a Teacher sent from God, and the precise date at which he would be cut off as a sacrifice for the sin of the world. It runs thus: —"Seventy weeks are determined upon thy people, and upon thy holy city, to finish the transgression, and to make an end of sins, and to make reconciliation for iniquity, and to bring in everlasting righteousness, and to seal up the vision and prophecy, and to anoint the Most Holy. Know therefore and understand, that from the going forth of the commandment to restore and build Jerusalem unto the Messiah the Prince shall be seven weeks and threescore and two weeks . . . . And after threescore and two weeks shall Messiah be cut off, but not for himself . . . . And he shall confirm the covenant with many for one week: and in the midst of the week he shall cause the sacrifice and oblation to cease." Let the reader carefully observe the chronological points in this prophecy. *Seventy weeks are determined:* here a day stands for a year, as the connection indicates, and as

is elsewhere plainly stated, "I have appointed thee each day for a year." By "seventy weeks," or 490 days, therefore, are meant 490 years. *From the going forth of the commandment to restore and build Jerusalem unto the Messiah the Prince shall be seven weeks and threescore and two weeks.* Now the edict to rebuild Jerusalem was issued by Artaxerxes Longimanus, in the twentieth year of his reign, which corresponded to the year 454 B. C. From this date to the appearing of Messiah was to be "seven weeks and threescore and two weeks," or 69 weeks, or 483 years; and 483 years bring us down to A. D. 29; just the time when Jesus by his public baptism in Jordan, and by the descent of the Holy Ghost upon him, assumed the office and work of the Messiah—and when, as the evangelist Luke tells us, "Jesus himself began to be about thirty years of age." *Afterwards Messiah shall be cut off, but not for himself . . . in the midst of the week he shall cause the sacrifice and oblation to cease*, that is, in the midst of the "seventieth" or remaining week. Now, it is well known that the Saviour's ministry lasted just three years and a half, or into the midst of this prophetic week, when he was cut off by crucifixion. Then, and thereby, "He caused the sacrifice and the oblation to cease;" that is, so far as the Divine intention in the appointment of these sacrifices and oblations was concerned, they ceased at the death of Christ—in the middle of the week. Then the great sacrifice which they had adumbrated was offered. They ceased to have any significancy, no reason existing for their longer continuance.—So clear and definite were the prophet's utterances, and so punctual and exact was their fulfilment. After all the changes and revolutions, of six successive centuries, the prophecy and history correspond with each other, *even to a year, and the frac-*

*tion of a year!* With such facts as these before him, who but must acknowledge that "holy men of old spake as they were moved by the Holy Ghost?"

The glance we have now taken, rapid as it has been, of the fulfilment of prophecy, as attested by the actual and written history of mankind, offers a clear demonstration that the world with all its affairs and interests is under the conduct and direction of a *Providence*—a Providence as universal and infallible in its agency as is the force of gravity in its action. How otherwise, out of the chaos of human actions, their vices and crimes, iniquities and idolatries, plots and intrigues, wars and revolutions, running without counsel or concert through periods of hundreds and thousands of years,—could such definite and certain results be evolved, and evolved, too, at the precise time, in the precise manner, and by the precise means foretold and promised? It is, moreover, obvious hence, that the Divine Providence consists not, as some suppose, in occasional and unrelated interpositions in the affairs of men, but is a supervision and control as all-embracing and unremitting in their activity as is the great force that regulates the motions of the universe. It correlates and unites all that transpires in the history of the nation and in the life of the individual, into a harmonious and effective system. Every agent is brought forward in its proper place, every force and influence presses in its right direction, every change and connection is effected at its set time, "for to do whatsoever his hand and his counsel determined before to be done."

"Blessed be the Most High, and honor and praise be unto him that liveth forever, whose dominion is an everlasting dominion, and whose kingdom is from generation to generation; he doeth according to his will in the armies of heaven, and among the inhabitants of the earth."

## ANALOGY VIII.

*As the Sun's gravitation, light, heat, and actinism, having in their outward flow bathed our globe on every side with their vital influences, sweep onward still, in undiminished fulness, to do the same for other globes that roll beyond;—so the incarnation, ministry, and atonement of the Sun of Righteousness, while proffering an ample and suitable provision for all the wants and woes of sinful humanity, may, in all their plenitude of grace, pass on to benefit and to bless the populations of other worlds.*

### PHENOMENA.

THE science now called Astronomy, without doubt, had its origin in the contemplation of the Sun, and its apparent motion from day to day through the heavens. And it would be interesting, did our space and plan allow, to trace, as history enables, the persevering study and efforts of men to unravel and explain the mystery in which its revolutions seem to be involved. It was by various and long-continued observations, and by a gradual process of thoughtful reasoning upon those observations that a few gifted minds at length arrived at correct conclusions respecting its true position, and its relation to the system of nature at large. The common idea entertained through all the earlier ages of the world's history was, that the Sun was a mere appendage of the earth, and that the sole purpose of its creation was to give light and warmth to the creatures that inhabited it. Nor have the vast majority of our race to this day attained to more worthy views. But, happily, the times of this ignorance with us have passed away; all persons of ordinary education now know that the Sun is the common centre, the common head, and ruler, and benefactor of a great *family* of similar worlds; that to all the globes embraced in the solar system it sustains the same relation and performs the same offices as to our own. What the Sun is to

the earth he is to each of the planetary globes that encircle it.

The Sun's *gravitation*, which guides and preserves the earth in its appointed orbit, measures out its years, and secures for it all the advantages of regularly recurring seasons, performs the same function for all the other planets, whether large or small, nearer or more remote.

And the *light* of the Sun, which daily illumines the face of the earth, illumines in like manner the face of every member of his great household. The ether waves which perpetually emanate from his glowing sphere, and bathe our own planet in an ocean of light, sweep onward and bathe all the others that lie beyond even to the utmost bounds of the system.

The *heat* and *chemical power* of the Sun, also, which are productive of so many beneficent results on the earth, are conveyed in the same waves to every planet and satellite of the vast scheme to which we belong. What our globe intercepts and receives of these does not appreciably diminish the fulness or the force of those waves to supply other worlds. Of the whole amount of light, and heat, and actinic influence thrown out by the Sun, from his entire surface, the earth takes up less than *one*-2000,000,000th part. The rest passes on to serve other planets, and to do other work in the great scheme of creation which we know nothing about.

The same is true of the *magnetism* of the Sun. He is the grand centre of this mysterious force. The earth, as shown in a preceding chapter, is in perpetual magnetic sympathy with the Sun. And no commotion, or unusual disturbance, can take place in the solar photosphere, but will sensibly affect our whole globe, sometimes setting every compass needle in a quiver, confounding telegraphic messages in their flight along the wires,

throbbing through the earth and the atmosphere, and overspreading the firmament of every clime with the magnificent displays of the Aurora. And the magnetic influence proceeding from the Sun, which thus affects our own globe, must affect all the other globes of the system in like manner. Mercury and Venus, being so much nearer the Sun, must respond even more swiftly and more distinctly to these influences than our own planet. But those that lie beyond are quickly reached and roused. With the speed of light the magnetic impulses sweep on to ruddy Mars. Next the vast globe of Jupiter is thrilled from pole to pole as the magnetic wave rolls in upon it; then Saturn feels the shock; and then the vastly more remote Uranus and Neptune are swept by the ever-widening wave;—and who shall tell us where that wave dies out, or whether its influence *ever* becomes extinct?

Thus we see that the Sun is the common head, and ruler, and benefactor of the whole system, and that what he does for our own planet he does for all the rest. Like the earth, all are dependent upon and governed by him. Like the earth, all are enlightened, and warmed, and stimulated by his beams. And, like the earth, all are related to him in one common bond of magnetic sympathy. This general correspondence and similarity have naturally suggested the inference, that, like the earth also, the other planets may be *the abodes of life and intelligence.* And this interesting supposition receives no little additional strength as well as confirmation from a number of other specific analogies discovered to exist between our globe and each of the other planets of the system. These analogies have been stated with great force and clearness by a distinguished Scotch divine:

"Now, what is the fair and obvious presumption?" he asks. "The world, in which we live, is a round ball of

determined magnitude, and occupies its own place in the firmament. But when we explore the unlimited tracts of space, which is everywhere around us, we meet with other balls of equal or superior magnitude, and from which our earth would either be invisible, or appear as small as any of those twinkling stars which are seen on the canopy of heaven. Why then suppose that this little spot, little at least in the immensity which surrounds it, should be the exclusive abode of life and of intelligence? What reason to think that those mightier globes which roll in other parts of the creation, and which we have discovered to be worlds in magnitude, are not also worlds in use and dignity? Why should we think that the great Architect of nature, supreme in wisdom as he is in power, would call these stately mansions into existence, and leave them unoccupied? Are we to say, that they are so many vast and unpeopled solitudes; that desolation reigns in every part of the universe but ours; that the whole energy of the divine attributes is expended on one insignificant corner of these mighty works; and that to this earth alone belongs the bloom of vegetation, or the blessedness of life, or the dignity of rational and immortal existence?

But we have something more than the mere magnitude of the planets to allege, in favor of the idea that they are inhabited. We know that this earth turns round upon itself; and we observe that all those celestial bodies, which are accessible to such an observation, have the same movement. We know that the earth performs a yearly revolution round the Sun; and we can detect in all the planets which compose our system, a revolution of the same kind, and under the same circumstances. They have the same succession of day and night. They have the same agreeable vicissitude of the seasons. To

them, light and darkness succeed each other; and the gayety of summer is followed by the dreariness of winter. To each of them the heavens present as varied and magnificent a spectacle as to us. To all of them God has given the Sun to rule the day; and to many of them has he given moons to rule the night. To them he has made the stars also. In all these greater arrangements of divine wisdom, we can see that God has done the same things for the accommodation of the planets that he has done for the earth which we inhabit.

It lends a delightful confirmation to the argument, when, from the growing perfection of our instruments, we can discover new points of resemblance between our earth and the other bodies of the planetary system. We can now see of one, that its surface rises into inequalities, that it swells into mountains and stretches into valleys; of another, that it is surrounded by an atmosphere which may support the respiration of animals; of a third, that clouds are formed and suspended over it, which may minister to it all the bloom and luxuriance of vegetation; and of a fourth, that a white color spreads over its northern regions, as its winter advances, and that on the approach of summer this whiteness is dissipated—giving room to suppose, that the element of water abounds in it, that it rises by evaporation into its atmosphere, that it freezes on the application of cold, that it is precipitated in the form of snow, that it covers the ground with a fleecy mantle, which melts away from the heat of a more vertical Sun; and that other worlds bear a resemblance to our own, in the same yearly round of beneficent and interesting changes.

Thus the discoveries of science give us to see that yon Sun, throned in the centre of the planetary system, gives light and warmth, and the vicissitude of seasons, to an

extent of surface several hundreds of times greater than that of the earth which we inhabit. They lay open to us a number of worlds, rolling in their respective circles around this vast luminary—and prove, that the ball which we tread upon, with all its mighty burden of oceans and continents, instead of being distinguished from the others, is among the least of them. And we should learn hence, not to look on our earth as the universe of God, but one paltry and insignificant portion of it; that it is only one of the many mansions which the Supreme Being has created for the accommodation of his worshippers, and only one of the many worlds rolling in that flood of light which the Sun pours around him to the outer limits of the planetary system."*

The conclusion thus reached by natural reason, from the facts disclosed by science, is not only in harmony with all that is revealed in the holy Scriptures, but receives support and confirmation from not a few intimations and even clear statements found therein. There, repeated mention is made of other "worlds" than our own, and of other intelligent and moral beings than the human race. In the epistle to the Hebrews we read, "God, in these last days, hath spoken to us by his Son, whom he hath appointed heir of all things, by whom also he made the WORLDS." And again, "Through faith we understand the WORLDS were framed." The earth, therefore, is but one of many worlds which God has created and framed. The inspired Word also, in sundry places and in divers manners, speaks of various grades of rational and moral beings of a nature far more exalted than man—of angels and archangels—of thrones, dominions, principalities, and powers—of cherubim and seraphim—and of the hosts of heaven who worship God. It also in-

* Chalmers' *Astronomical Discourses*, No. 1.

forms us of the existence of another class of beings, the unholy angels, "who kept not their first estate." And these are said to have "left their OWN HABITATION"—words that plainly leave us to infer, that these several orders of angelic beings, holy and unholy, have assigned to them as their abodes distinct spheres, or local habitations. Such are a few of the clear testimonies of Scripture to the doctrine of a plurality of worlds.

And this doctrine once admitted, what thoughts, what contemplations, rush in upon the mind! When we lift up our eyes on high, and consider not the planetary system only, but the starry heavens, the suns, and systems, and worlds innumerable, which are strewn by millions through the voids of unbounded space; and then think of all these as peopled with myriads of intellectual beings of various grades and orders—what an overwhelming view is opened before the mind of the greatness and glory of Jehovah's empire! "Great is the Lord, and greatly to be praised; and his greatness is unsearchable. I will speak of the glorious honor of thy majesty, and of thy wondrous works. Thy kingdom is an everlasting kingdom, and thy dominion endureth throughout all generations."

## TEACHINGS.

From the holy Scriptures we learn that a knowledge of the strange and amazing work of human redemption is conveyed to other worlds, and disseminated among other orders of intelligences. The Bible plainly tells us that the sufferings of Christ and the glory that should follow are things over which the angels bend, and with special interest desire to look into. And thus, as the Sun's gravitation, light, heat, and actinism, having in their outward flow bathed our globe on every side with their vital influences, sweep onward still, in undiminished

fulness, to do the same for other globes that roll beyond; —*so the incarnation, ministry, and atonement of the Sun of Righteousness, while proffering an ample and suitable provision for all the wants and woes of sinful humanity, may, in all their plenitude of grace, pass on to benefit and to bless the populations of other worlds.*

The wonderful scheme devised and executed to save Man, revealed, not to his own fallen race only, but to the whole intelligent universe, a new aspect of the Divine character, a new and hitherto unknown attribute of their God and King. And to all holy beings such a revelation must have been a subject of contemplation possessing supreme interest—must, indeed, have filled them with transports of wonder, joy, and praise! From the beginning they had known and admired his glorious holiness. And they had before beheld ample manifestations of his power, wisdom, and goodness in the creation, and in the arrangements and productions of a thousand different worlds. And they had witnessed, too, the most signal display of his justice in the condemnation and banishment to "everlasting chains under darkness" of their fellow-angels, "who kept not their first estate." But to the unsearchable nature of the Deity pertained another property, another element of character, which they had never known—his *mercy*—his disposition to pity and to save the guilty. This was an attribute they had never seen called into exercise till manifested towards the fallen race of earth.

That the fact of man's fall, with its corrupting and fatal consequences, became known at once to angelic beings, we have abundant evidence in the sacred history. From the first act of disobedience in the Garden down through all the ages, they were constant witnesses of the foul and wicked rebellion carried on by the children of men

against the divine law and the divine authority. All along they saw the sin which abounded in every corner of the earth; and well they understood its malignity and enormity as committed against the high and holy Majesty of heaven. They knew, too, the unswerving justice of God, and that his truth would bind him to execute his threatenings against the doers of iniquity. When, therefore, nothing else was to be looked for but the visitation of an almighty vengeance to sweep them all away, as by one fell swoop, to everlasting destruction, such as they knew had been inflicted upon their rebellious associates —oh, with what intense interest and overpowering wonder must they have watched and studied the advancing steps of the Most High, when, from amidst these awful and urgent demands of immutable truth and justice, they saw the unfolding of the attribute of Mercy—when they beheld the Supreme Lawgiver himself casting upon his guilty creatures an eye of pity, and resolving upon a plan of unsearchable wisdom for their rescue, and their restoration to his arms! Oh, surely, if in view of the accomplishment of the work of creation, "the morning stars sang together, and all the sons of God shouted for joy," louder far must have been the hallelujahs of adoration that now rose from their lips, and more transporting the anthem peals of ecstacy that swept as a tide through all their ranks, as they beheld the Just and Holy One, for the first time, investing himself in the lovely robe of mercy and grace!

Never did scene or subject so engross the interest, and entrance the spirits of the celestial hosts, as the redeeming work of the Son of God. They watched and attended his steps through all his mysterious career of humiliation, suffering, and sorrow, from the manger to the grave. An angel bore the glad message to the Vir-

gin of Nazareth, that "the Holy Ghost should come upon her and overshadow her, and that she should conceive and bring forth a child, who should be called the Son of the Highest." An angel, accompanied by a multitude of the heavenly host, announced to the shepherds the birth of that Divine Son. Angels ministered to him in his sore temptations amid the solitudes and wild beasts of the wilderness. An angel flew to his succor, and strengthened him in his mortal agony and bloody sweat in the dark retirement of Gethsemane. An angel, whose countenance was like lightning and garment white as snow, rolled away the stone from the door of his sepulchre. And angels attended his ascension and return to sit again in triumph at the right hand of the Father Almighty. And now, the mysterious and high emprise being accomplished, as they see how in virtue of his amazing sacrifice all the demands of a holy law have been satisfied—how mercy has triumphed over justice, and thrown open a door by which sinful and polluted wanderers may be re-admitted into fellowship with the Holy God, and abide forevermore in his presence and in his love—as they now see and understand all this, myriads of rich voices break forth in the joyful acclamation, "O the depth of the riches both of the wisdom and goodness of God! how unsearchable are his judgments, and his ways past finding out! Glory be to God for such peace and good-will to men; glory in the highest!"

We are not left to suppose, however, that a knowledge of the great work of redemption, or that interest in it, is confined to those celestial beings that minister more immediately around the Throne; it was the Divine purpose that all created intelligences should become acquainted with the glorious achievement. Scripture informs us that creation has its provinces, its regions,

and its spheres; accordingly we read of Thrones, Dominions, Principalities, and Powers. And to all these orders of angelic beings, God purposed that the riches of his grace, as manifested in Christ Jesus, should be made known. Thus speaks the inspired Apostle, "Unto me, who am less than the least of all saints, is this grace given, that I should preach the unsearchable riches of Christ, *to the intent that now unto the Principalities and Powers, in heavenly places, might be known, by the church, the manifold wisdom of God*, according to the eternal purpose which he purposed in Christ Jesus our Lord."

*Might be known, by the Church, the manifold* WISDOM *of God.* In the beautiful and well-ordered scheme of Divine Grace, there is, indeed, wisdom as well as mercy —profound and manifold wisdom. There is wisdom, not only in the wondrous Sacrifice by which salvation is made possible, but also in the means adopted to apply the remedy. There is wisdom in the agencies employed to enlighten the mind, to renew the heart, to sanctify the soul. There is wisdom in the various dispensations by which the church is edified, guided and brought to glory. And of all this, swift-winged messengers never cease to carry the glad tidings to the heavenly hosts: "For I say unto you that there is joy in the presence of the angels of God over one sinner that repenteth." And the troops of released, disembodied souls, too, that in unceasing succession emigrate from the church militant to the church triumphant, bear with them a full history of the same. Each of these has a tale of wondrous mercy and of gracious experience to relate. And all, together, serve as a perpetual stream of fuel to the fires of heaven's devotions, causing them to burn brighter and to flame higher evermore, as the Redeemer multiplies the triumphs of his Cross.

Nor are we altogether shut up to believe that the direct and saving *efficacy of the atonement* made by the Son of God is confined to the race of Adam. We find in the scriptures nothing to forbid the idea, nay we discover there various expressions that seem to favor it, that, as "the place of a skull" is the Calvary of the human race, so this particular globe may be the chosen Calvary, the altar of atonement, for the sin of the whole universe. "Christ was *once* offered to bear the sins of many." We have no express information, indeed, whether there be other worlds, whose populations, like ourselves, have fallen, and have need of an atonement. But the Holy Spirit of inspiration, whose eye is abroad upon the face of the immeasurable universe, and knows the history and condition of each globe that exists, has indited these remarkable revelations: "That he is to gather together in one all things in Christ, both which are in heaven, and which are in earth, even in him"—"That at the name of Jesus every knee should bow, of things in heaven, and things in earth, and things under the earth" —"And that by him God reconciled all things unto himself, whether they be things in earth, or things in heaven" —"And I beheld, and I heard the voice of many angels round about the throne, and the number of them was ten thousand times ten thousand, and thousands of thousands; saying with a loud voice, Worthy is the Lamb that was slain to receive power, and riches, and wisdom, and strength, and glory, and honor, and blessing. And every creature which is in heaven, and on earth, and under the earth, and such as are in the sea, and all that are in them, heard I saying, Blessing and honor, and glory, and power, be unto him that sitteth on the throne, and unto the Lamb, forever and ever."

These, assuredly, are revelations, by whatever rule

interpreted, that open up before us vistas broad and deep, through which we obtain dazzling glimpses of the magnificence of the economy of Redemption, and of the exceeding glory of the final issues of the great Sacrifice offered upon the cross.

## ANALOGY IX.

*As the Sun himself, in obedience to the universal law of gravity, is in motion, and carries with him the whole planetary system along an orbit so vast as to require for its completion a period beyond all human comprehension;—so the Sun of Righteousness, in virtue of his everlasting love, will lead onward his ransomed hosts along a cycle of ages beyond the enumeration of men or of angels.*

### PHENOMENA.

AMONG the ancients, the solar orb, unlike the earth or anything pertaining to the earth, was regarded as being free from all imperfection and exempt from all corruptibility. The Sun, to them, was the type of absolute purity. And this idea was handed down from generation to generation unquestioned and undoubted. But about the beginning of the seventeenth century of our era, when the telescope was invented, this favorite notion received a profound shock. By means of that instrument, it was discovered that even the dazzling face of the Sun, which had always been deemed immaculate, was marked by numerous dark spots. These were first observed, it is believed, by Fabricius and Galileo. And it was only by degrees that these and other astronomers could bring their minds to admit that they really belonged to the body of the Sun; one supposed that they must be intercepting clouds, and another conjectured that they were planetary globes far away from the Sun with their dark

sides turned toward the earth. But continued observations ere long dispelled these erroneous ideas. These spots were seen to advance uniformly over the Sun's disc, till they disappeared on the opposite side; and, after an absence of as many days as they had been visible, reappeared on the edge where they had been first noticed, to pursue the same course again. Repeated observations of these movements led to the conclusion that they belonged to the globe of the Sun, and that they must be produced by a rotation of that globe, similar to that of the earth, on its own axis. And, in a short time, the period of its rotation was determined, and found to be a little more than 25 days. This was an important discovery, and one that speedily led to others of equal interest and importance.

The fact that the Sun turns upon itself, in time, suggested the idea that it must also have an orbital or advancing motion. Lalande, as early as 1776, entertained this opinion, and reasoned on the subject in the following manner: "The rotation of the Sun indicates the existence of a translatory movement, or that the Sun travels in space, which will probably be recognized one of these days as a very important fact in Cosmology. Rotatory motion, considered as the physical effect of any cause, is produced by an impulsion communicated from without the centre; but any force applied to a given body, and causing it to turn on its axis, cannot fail to carry the body along, and it is impossible to conceive the one without the other. *It is therefore quite evident that the Sun must really move through absolute space;* but as it carries along with it the Earth, and all the other planets and comets which revolve round it, we cannot perceive this movement unless, after a lapse of centuries, it be observed that the Sun shall be found to have

approached nearer to certain fixed stars than to others situated in an opposite direction. In such a case the apparent distances of the various stars from each other will be found to have increased in one direction, and to have diminished in another; and this will teach us in what direction the Solar System is travelling through space."*

What was thus but a theory with Lalande was afterwards proved to be a fact by the distinguished Sir William Herschel. From multiplied observations and a careful study of the proper motions of a number of stars he was enabled to prove that the Sun not only moves, but travels towards the constellation Hercules. Fifty years later, Argelander, a Prussian astronomer, from more numerous and precise data, confirmed the conclusion of Herschel. Several others since have taken up the subject, and the result of the labors of all these is, that it is now regarded as an established fact among astronomers, that the Sun is in translatory motion, and that the direction in which he advances is along a right line joining the stars $\pi$ and $\mu$, in the constellation Hercules. This motion of the Sun, according to Proctor, "is carrying him from the borders of the southern rich region towards the borders of the northern rich region (that is, rich in stars). Of the true habitudes of those regions of space through which he is bearing, and has lately borne, his family of planets we know little. But as we look back along the extended track he has pursued, and see the richness of those regions he has left, and as we look forwards and trace his course in imagination towards the borders of that rich region whose glories gather into their chiefest splendor in Cygnus, the conception is suggested that he is now winging his way through a relatively bar-

* See *Encyclopédie Méthodique.*

ren region, that he has left and will again visit more glorious star-depths than those through which he now pursues his course."

The proper motion of the Sun, and the direction of that motion, being determined, the next question which engaged the study of astronomers was, where and what is the centre around which he revolves? After numerous observations, and laborious as well as ingenious calculations, this mighty problem is regarded as solved. Professor Mädler, of Dorpat University, has located it in the Pleiades, which is the nearest and richest cluster of stars in our heavens; and the star Alcyone, being the brightest of this group, he has concluded, must be the grand centre round which our Sun with its retinue of planets is revolving.

Mädler has computed that the distance of Alcyone from the Sun is no less than 34,000,000 times the distance of the Sun from the earth, or 3,128,000,000,000,000 miles—a space so vast as to require 537 years for its light to come to us, although moving at the rate of twelve millions of miles per minute. The speed with which the Sun advances in his mighty orbit around that distant centre has been computed to exceed 150,000,000 of miles per annum, or more than 400,000 miles per day; and the period required to complete its revolution to be no less than 18,000,000 of years! What distances, what velocities, what periods are these—reason staggers and imagination grows dizzy in attempting to grasp them! What a diminutive atom is what we proudly call "our great world" in these depths of space! What an infinitesimal portion is the lifetime of man, yea the whole period of human history, compared with that of *one* revolution of the Sun around its sidereal centre! What an humbling lesson to human pride! "Lord, what is man

that thou art mindful of him, or the son of man that thou visitest him?"

There are those—and they scholars of no mean rank—who maintain that the germ of this grand physical truth, the discovery of which constitutes the greatest triumph of human science, is to be found in the Sacred Book. It lies enfolded, they think, in this brief but striking question, addressed to Job by God himself out of the midst of the whirlwind, "Canst thou bind the sweet influences of Pleiades, or loose the bands of Orion?"

"If we examine the text in the original," says Hugh Macmillan, "we find that the Chaldaic word, translated in our version Pleiades, is *Chimah*, meaning literally a hinge, pivot, or axle, which turns round and moves other bodies along with it. Now, strange to say, the group of stars thus characterized has recently been ascertained, by a series of independent calculations—in utter ignorance of the meaning of the text—to be actually the hinge or axle round which the solar system revolves. M. Mädler, of Dorpat, has found that Alcyone, the brightest star of the Pleiades, is the centre of gravity of our vast solar system—the luminous *hinge* in the heavens round which our Sun and his attendant planets are moving through space. The very complexity and isolation of the system of the Pleiades, exhibiting seven distinct orbs closely compressed to the naked eye, but nine or ten times that number when seen through a telescope—forming a grand cluster, whose individuals are united to each other more closely than to the general mass of stars—indicate the amazing attractive energy that must be concentrated in that spot. . . With this new explanation, how remarkably striking and appropriate does the original word for Pleiades appear! What a lofty significance does the question of the Almighty receive from

this interpretation! 'Canst thou bind the sweet influences of Pleiades?' Canst thou arrest, or in any degree modify, that attractive influence which it exerts upon our Sun and all its planetary worlds, whirling them round its pivot in an orbit of such inconceivable dimensions, and with a velocity so utterly bewildering?"

"In accordance with this higher interpretation," continues he, "the influences of the Pleiades may be called *sweet*, as indicating the harmonious operation of those great laws by which our system revolves around them. In this vast and complex arrangement, not one wheel jars or creaks—not a single discordant sound disturbs the deep, solemn quietude of the midnight sky. Smoothly and silently each star performs its sublime revolutions. Although our system is composed of so many bodies—differing in size, form, and consistence—they are all exquisitely poised in space in relation to one another, and to their common centre; their antagonistic forces are so nicely adjusted as to curb every orb in its destined path, and to preserve the safety and harmony of the whole. Moons revolve around planets, comets and planets around the Sun, the Sun around Alcyone, and Alcyone around some other unknown Sun, hid far away in some unexplored depths of our galaxy; and grand beyond conception, this cluster of systems around the centre of ten thousand centres—the great white throne of the Eternal and the Infinite; and all with a rhythm so perfect, that we might almost believe in the old poetic fable, The Music of the Spheres."*

## TEACHINGS.

As the Sun of Nature thus, in obedience to the universal law of gravity, is in motion, and carries with him the

*See *Bible Teachings in Nature*, pp. 6–11.

whole planetary system along an orbit so vast as to require for its completion a period beyond all human comprehension ;—*so the Sun of Righteousness, in virtue of his everlasting love, will lead onward his ransomed hosts along a cycle of ages beyond the enumeration of men or of angels.*

To man, life is the antechamber, and death is the door, to another and an enduring state of existence. And through this door the Lord's redeemed have ever been passing in a continuous stream, ever since the world began, to meet around his throne in the glorious world above. On bidding adieu to earth and earthly interests, they ascend "unto Mount Zion, and unto the city of the living God, the heavenly Jerusalem, and to an innumerable company of angels, to the general assembly and church of the first-born, which are written in heaven, and to God the Judge of all, and to the spirits of just men made perfect, and to Jesus the mediator of the new covenant."

To the beloved John, it was given, in a vision, to see this general assembly and church of the first-born. "After this, I beheld," saith he, "and lo a great multitude, which no man could number, of all nations, and kindreds, and people, and tongues, stood before the throne, and before the Lamb, clothed with white robes, and palms in their hands; and cried with a loud voice, saying, Salvation to our God which sitteth upon the throne, and unto the Lamb." And concerning this happy and exultant throng it was said to him, *The Lamb which is in the midst of the throne shall feed them, and shall lead them unto living fountains of waters.*

These are words of profound interest and far-reaching significance, and therefore demanding serious and devout consideration. First, the redeemed are here assured that

they shall be furnished with *nourishment* appropriate to their new and sanctified condition—they shall have "food" and they shall have "drink." Now, spiritual beings need no flesh, or fruits, or fluids to sustain them; the food of the soul is *truth*, and the drink of the immortal mind is *knowledge*. In this sense the terms are used in the scriptures. Thus we read, "I will give them pastors after mine own heart, who shall feed them with *knowledge* and *understanding*." And our blessed Lord speaking to Peter, saith, "Feed my sheep—Feed my lambs," that is, *instruct* my followers, young and old. And Peter himself, employing the same expression, saith to the elders, "Feed the church of God." And so in regard to drink; our Saviour, speaking of spiritual instruction, says, "If any man thirst, let him come unto me and drink." On another occasion, he saith, "Whosoever drinketh of the water that I shall give him shall never thirst." It is obvious hence that the food and drink, promised to the assembly of the redeemed, are *knowledge* and *instruction*. Second, it is stated in these words, that the fountains to which the saints shall be led, unlike stagnant pools, or fitful streams, shall be fountains of "living waters," that is, the knowledge and instruction imparted shall be like *perennial springs*, ever fresh and ever flowing, and the happiness derived therefrom shall know no intermission or end. Third, it is here expressly said that he who shall communicate this knowledge and instruction will be none other than the Redeemer himself, in whom dwelleth all the treasures of wisdom and knowledge: "The Lamb which is in the midst of the throne shall feed them, and shall lead them unto living fountains of waters." He himself will condescend to be the Instructor of his ransomed people; He himself will ever gratify their hunger and thirst after knowledge by

discoveries and revelations of the works and ways of the Almighty which shall fill them with transports of wonder, love, and praise.

Great and wonderful as is this promise, its significance, and its interest to us, will be not a little enhanced if we glance at what is said in the scriptures respecting the enlarged and invigorated capacities of the saints to receive and acquire knowledge, in their heavenly state. St. Paul informs us that the views and understanding which they now have, compared with those they shall have in heaven, are but as the ideas of a little child to the thoughts and judgments of mature manhood; and that all the knowledge which they possess here will vanish, will fade as out of mind, in the superior light to which they shall attain in the kingdom of glory. He expressly tells us that our powers of perception there will be as superior to those we have here, as the near and clear view of an object is superior to the faint and blurred impression we receive of it when seen through an obscure medium: "Now we see through a glass darkly, but then face to face." He assures us, moreover, that our knowledge there will be very accurate and comprehensive: "Then," adds he, "shall I know even as I am known,"—a statement that clearly implies that the saints' understanding shall bear some fair resemblance to that of their Divine Redeemer, and that their knowledge of heavenly scenes and objects will be quick, certain and familiar as that they have of their immediate friends and acquaintances on the earth.*

From all this we may fairly infer that, the saints in heaven will not only be freed from all the impediments which the weakness of the flesh and the disorders of sin offer to the acquisition of knowledge, but also be endowed

* See 1 Corinthians xiii. 8–12.

with invigorated, and perhaps, altogether new faculties —with powers of *vision* capable of penetrating substances that are now opaque, and of clearly seeing objects that now require a microscope by reason of their minuteness, and scenes that now demand a telescope on account of their distance—with *auditory organs* of sensibility to receive the most exquisite impressions from sounds and voices now imperceptible to our dull ears—with *intellectual powers* to take in at a glance all the geometrical principles involved in the orbits of a whole sytem of celestial bodies, and, without pen, or paper, or numerical characters, to perform the most abstruse calculations respecting their motions and interactions, with the utmost rapidity and accuracy—and, with *moral perceptions and sensibilities* capable of duly appreciating every exhibition, every exercise, every shade of truth, justice, benevolence and holiness, and that with infinite delight. In addition to all this, they will be endowed, like the angels, with *ability to transport themselves through space* with infinite ease and swiftness. Moses and Elias, we know, descended from the world of glory to the Mount of Transfiguration, to converse with the Saviour concerning his decease which he was about to accomplish at Jerusalem, and then speedily returned again; and all other redeemed beings, doubtless, will possess the same power of self-transportation.

Thus endowed, thus physically, intellectually and morally qualified, to engage in divine studies and to enter on celestial investigations, "the Lamb which is in the midst of the throne shall feed them, and shall lead them to fountains of living waters." The glorified Redeemer will *discourse* to them on themes of heavenly wisdom, and communicate to them new truths, new and enlarged views of the works and ways of the Lord God Almighty.

This is in entire harmony with what we read in the scriptures from first to last concerning the dealings of Heaven with men. God himself held immediate converse with man while in his state of innocence. And even after his fall, he sent his Son to dwell among them, and to teach them as they were able to bear. But owing to their weakness and dullness, he had many things to say to them which they were not able then to receive. In heaven, therefore, where they are delivered from the evils of sin and the infirmities of the flesh, and are incomparably better fitted to receive and appreciate divine instruction, we may reasonably believe that the Holy Redeemer, who loves them with an unchanging and everlasting love, will communicate to them new and loftier truths, far larger and more worthy views of the divine character and divine providence, than ever entered the mind of man on earth. "This," says the philosophic Dr. Dick, "would be quite accordant with his office as the *Mediator* between God and men, and to his character as the *Messenger of Jehovah*, and the *Revealer* of the divine dispensations." And the pious Dr. Isaac Watts, in his sermon *On the happiness of separate spirits*, says: "Perhaps you will suppose there is no such service as hearing sermons, that there is no attendance upon the word of God there. But are we sure there are no such entertainments? Are there no Lectures of divine wisdom and grace given to the younger spirits there, by spirits of a more exalted station? Or, may not our Lord Jesus Christ himself be the everlasting Teacher of his church? May he not at solemn seasons summon all heaven to hear him publish some new and surprising discoveries which have never yet been made known to the ages of nature or of grace, and are reserved to entertain the attention, and to exalt the pleasure of spirits advanced to glory?

Must we learn all by the mere contemplation of Christ's person? Does he never make use of speech to the instruction and joy of saints above? Or, it may be, that our blessed Lord (even as he is man) has some noble and unknown way of communicating a long discourse, or a long train of ideas and discoveries to millions of blessed spirits at once, without the formalities of voice and language, and at some peculiar seasons he may thus instruct and delight his saints in heaven." Yes, doubtless, he shall lead them to green pastures of instruction, and to still waters of contemplation, wherefrom they shall feed on truths, and drink in knowledge, which delight and transport the spirits of angels.

Under such a Teacher, and with such instructions repeated at stated times and on all suitable occasions, what may disciples endowed with such capacities become in the course of the centuries and millenniums of their unending existence! What treasures of wisdom and knowledge will they gather! What harvests of happiness will they reap!

Nor yet is even this all—other methods and other means, we have grounds to believe, will be employed to instruct and felicitate the redeemed in glory. As the Sun of nature carries forward his whole family of planetary worlds amid the grandeur of stars, and constellations of stars, so the Sun of Righteousness may conduct his ransomed church from world to world, and from system to system, to survey the power, wisdom, and goodness of God as displayed in the magnificence and glories of the universe. The material creation is, and was designed to be, a manifestation of the perfections of the invisible Deity to his intelligent creatures, and therefore to the spirits of just men made perfect. Hence the celestial regions are the scenes to which the scriptures

perpetually refer, as presenting the most instructive and impressive displays of the Divine attributes. Thus we read: "The *heavens* declare the glory of God, and the *firmament* showeth his handiwork." "By the word of the Lord were the *heavens* made, and all the *hosts of them* by the breath of his mouth."—"The Lord hath prepared his throne in the *heavens*, and his kingdom ruleth over all." —"By his Spirit he hath garnished the *heavens*."—"The *heavens* declare his righteousness."—"The *heavens* shall declare thy wonders, O Lord." These, and scores more of similar passages, plainly teach us, that it is in the boundless regions of the heavens that the glory of God is most conspicuously displayed, and is especially to be contemplated by all devout and holy intelligences. It is, therefore, in entire accord both with reason and scripture to hold, that to visit and survey the celestial orbs, and contemplate the manifold works of God therein exhibited, will be the privilege and the happiness of the redeemed. Angels, we know, have visited our own globe through every period of its history, and, all unseen by mortal eyes, have been close observers of what existed and what transpired upon it, and have been even actors in some of the most important events that have determined the destiny of our race. And we are expressly told, that in the resurrection the righteous shall be as the angels, or similar to the angels. And, to this we may add, as has been before observed, that the disembodied spirits of at least two of the saints have returned and revisited the world they had many centuries before forsaken. Here, then, are clearly revealed facts that, not only countenance, but lend no doubtful support to the animating hope that the ransomed of the Lord may, in like manner, visit other worlds.

In these sublime excursions they will ever have the

presence of their adored and loving Lord, for he is everywhere present. Though they may depart from the heavenly Jerusalem in ten thousand companies, and proceed in as many different directions, each company will find him "in the midst." Angels also, those elder and more experienced sons of God, may be commissioned to accompany, and to instruct them concerning the things which they shall behold. And what a scene of diversified and uncounted wonders will each rolling globe open before their view—what physical arrangements, what natural scenery, what productions, what grades of population, what social habits and occupations! If our own planet, which ranks among the lesser, contains so many myriads of created wonders—so many mysterious forces in perpetual action and interaction in sea, and land, and air—so many minerals, and metals, and precious things enfolded in its bosom—so many scenes of grandeur, fruitfulness, and beauty overspreading its surface—so many electric, chemical, and magnetic phenomena in its atmosphere—so vast a variety of vegetation, of trees, plants, shrubs, herbs, and grasses, bearing all manner of fruits and exhibiting every grace of form and beauty of colorings—so many thousands and tens of thousands of living creatures; fishes, reptiles, beasts, birds, and insects; each embracing in its constitution a concourse of wise contrivances and happy adaptations—so many millions of human beings, diversified into distinct nations, tribes, and families—and having a history so prolonged and so crowded with marvellous events, physical, and social, and providential—that, a lifetime of incessant mental application is insufficient to become acquainted with the hundredth part of the facts embraced in one of these fields of study; if, I say, our smaller world contains such a number and variety of manifestations of the Divine Perfections, what

may we suppose will the redeemed visitants find in far more spacious worlds; in the ringed Saturn, or the belted Jupiter? And what in our *whole magnificent system*, where each planet, each satellite, differs from all the others, in its size and gravity, light and heat, soil and atmosphere, productions and living tenants, and in a multitude of other particulars? And as they wing their flight from one to another of these spheres, what interesting accounts of their physical changes and formation, and what instructive histories of their inhabitants, may their angelic guides relate to them: and what divine lessons may they deduce for their benefit from all they see and hear!

But our system, vast as it is, is only *one* of millions of similar systems embraced within the boundless empire of Jehovah; and each of these systems may differ from all other systems in its whole constitution and economy as widely as one globe differs from another. Our Sun with its system belongs to the cluster of stars which constitute what is called the "Milky Way," and this Milky Way, according to Sir John Herschel, contains more than 5,500,000 stars, each of which is believed to be a Sun, and to be attended with a retinue of planets like our own, though all invisible to mortal eyes. What then must be the entire number of planetary globes embraced within the bounds of this whole galaxy! But again, the Milky Way is only one of more than 3,000 similar galaxies, or nebulæ, that are visible through a good telescope; these lie in every direction in the immeasurable depths of infinite space; and who is able even to conjecture what other numbers may exist beyond the utmost power of human ken! Behold, then, in the material universe of God a field of wonders, wide, and deep, and high, and vast enough to occupy the study, to interest the minds,

and to inspire the devotion of his saints, through all the cycles of coming ages, and beyond all conceptions we can form of absolute eternity. What a prospect to set before created beings! What a hope to be entertained by mortal men!

When the redeemed of God, in the possession and exercise of their noble and invigorated faculties, and under the tuition of angels and the Lord of angels, shall have thus pursued their surveys and contemplations of worlds on worlds, and of systems on systems, ever coming to new revelations of the riches of wisdom, and power, and goodness of the Great Jehovah, and ever discovering new incentives to wonder, love, and praise—when they shall have thus advanced for a *thousand* years; for a *million* of years; for *all the millions* of years occupied by the Sun in completing its revolution around its distant centre in the Pleiades;—what will these beings have attained? what will they be in knowledge, and wisdom, and happiness? But when imagination, on weary and flagging wing, has pursued them even to that distant point, it must return and leave them still advancing and growing, still progressing towards the dimensions and excellencies of the Infinite—a point at an immeasurable distance, but toward which they shall be eternally stretching away!

But are these things so to be? Is not this going beyond all that is revealed, and forsaking the guidance of all sober reason? In nowise. Do we not read that the love of Christ for his people *passeth all understanding?* Is it not written that he is able to do *exceeding abundantly above all that we ask or think?*

"Condemn me not, cold critic! but indulge
The warm imagination; why condemn?
Why not indulge such thoughts as swell our hearts
With fuller admiration of that Power
Which gives our hearts with such high hopes to swell?
Why not indulge in his augmented praise?

Why should it seem a thing incredible that the Son of God should thus entertain and reward his ransomed people? Is it too much for him to do for those whom he loves with a love that passeth all understanding—loves with everlasting love? Hath he not already done even greater things for them, in forsaking the throne of his glory, descending to this nether and obscure world, taking upon him our humble nature, and subjecting himself to injury and ignominy, to agony and to death, that he might rescue them from sin and misery? Oh, after this, surely, surely, nothing can be deemed too great for him to do for them! Having thus ransomed them at an immeasurable price of humiliation, and sorrow, and suffering, is it too much to say, or to believe that he will instruct them, that he will honor them with the ministry of his angels, and show them the glories of his kingdom? Hath he not expressly sought to banish all such unbelief by assuring us that "Eye hath not seen, nor ear heard, neither have entered into the heart of man, the things which he hath prepared for them that love him?"

The soul of man—the ransomed soul—is great, is precious in the sight of heaven, and for it awaits a glorious destiny. O reader, consider what thou art, and what thou mayest become. Honor thyself. Live above the world thou art so soon to forsake. Live for God; live for glory, honor and immortality!

*Now unto Him that is able to do exceeding abundantly above all that we ask or think, according to the power that worketh in us, unto Him be glory in the church by Christ Jesus, throughout all ages, world without end. Amen.*

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